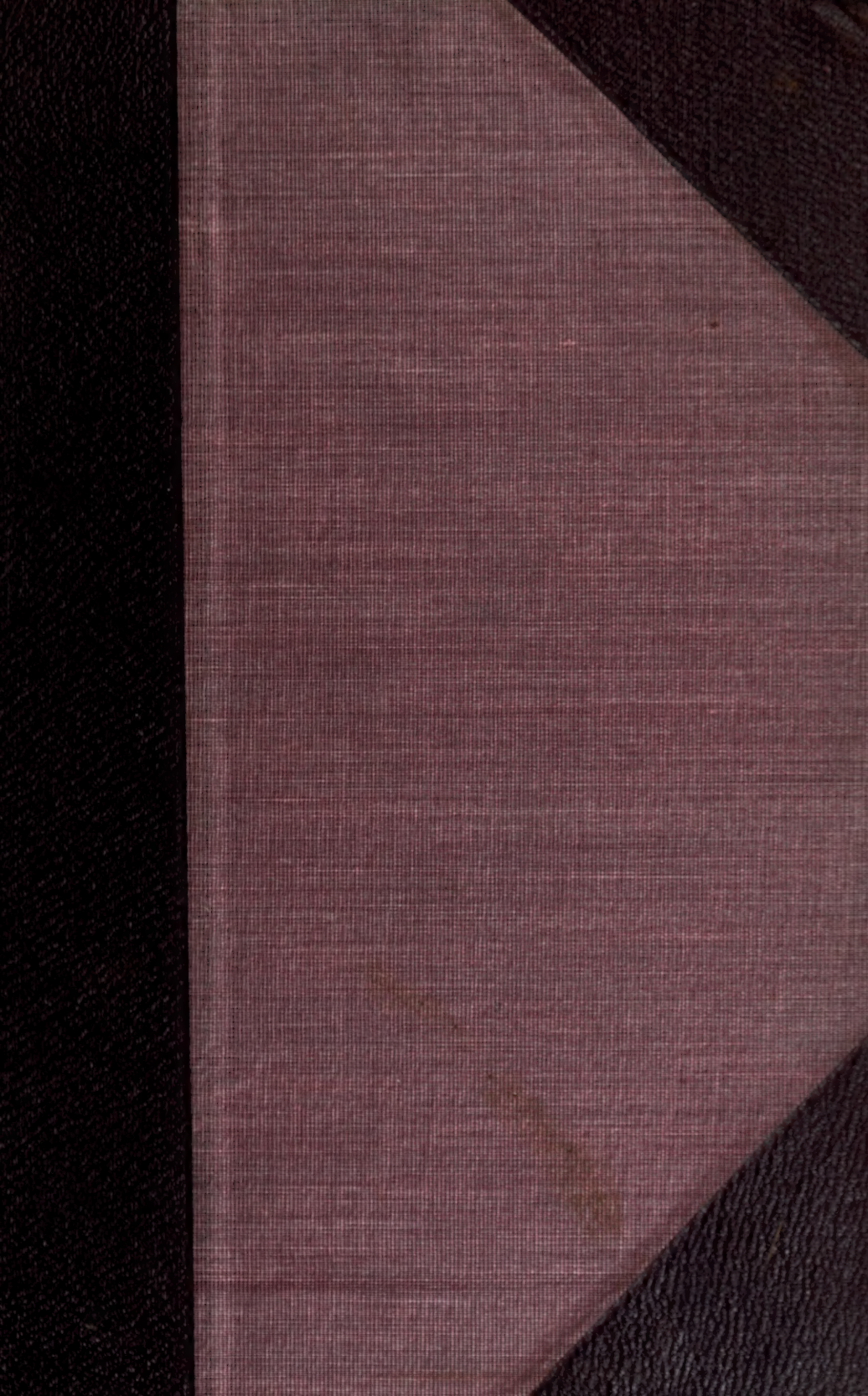




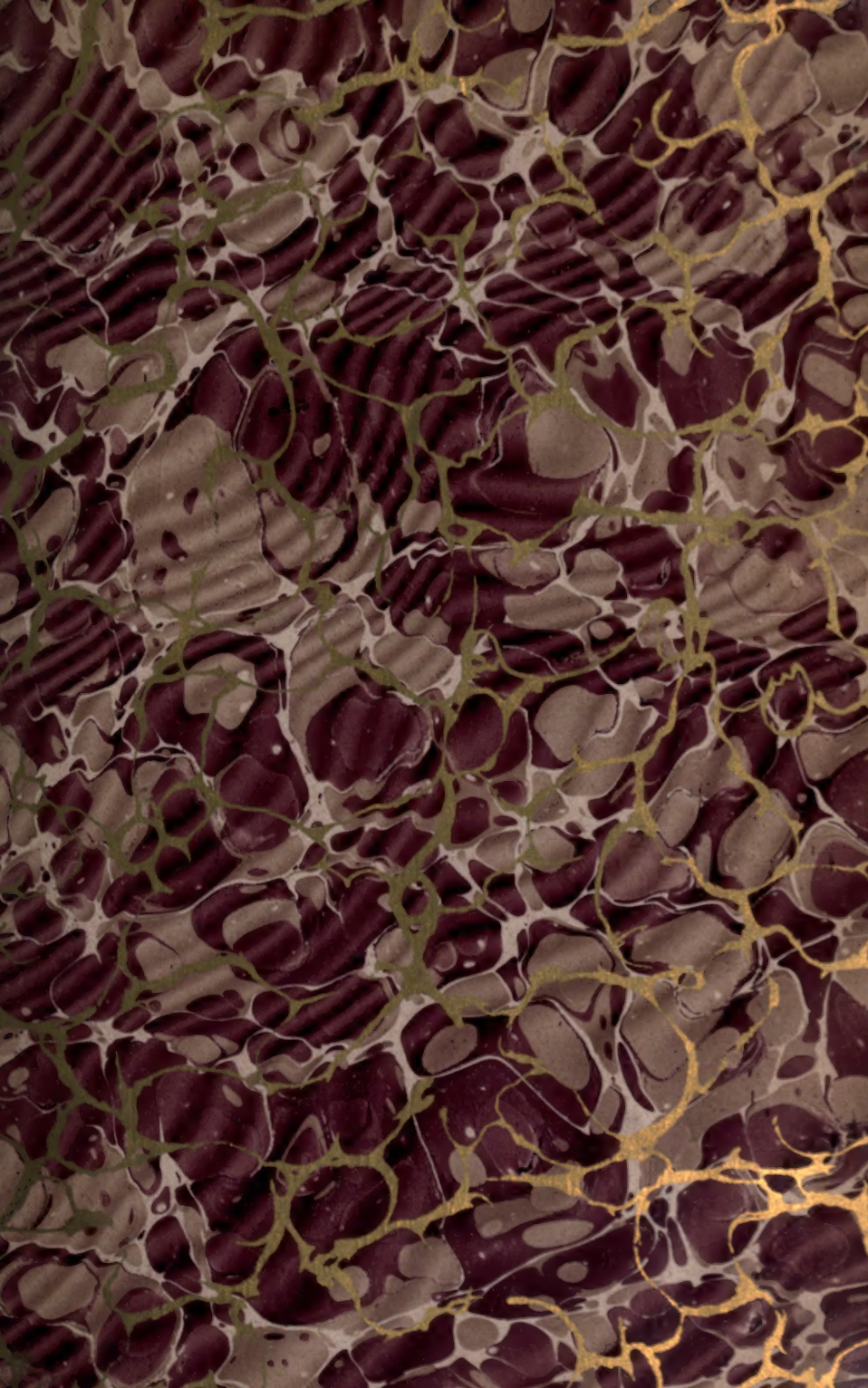




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## OFFICERS FOR 1919

*President*, H. H. KNOX, 17 Madison Ave., New York.  
*Vice-President*, F. F. SHARPLESS, 17 Madison Ave., New York.  
*Secretary-Treasurer*, LOUIS D. HUNTOON, 115 Broadway, New York.  
*Executive Committee*, MESSRS. H. H. KNOX, LOUIS D. HUNTOON, W. R. INGALLS, R. A. F. PENROSE, JR., F. F. SHARPLESS.

## COUNCIL

At large, ex-officio,  
H. H. Knox, New York.....Retires January, 1920  
F. F. Sharpless, New York.....Retires January, 1920  
Louis D. Huntoon, New York.....Retires January, 1920

Districts 1-2-3-4, New York, New England, and Eastern Canada.  
W. R. Ingalls, New York.....Retires January, 1922  
J. V. N. Dorr, New York.....Retires January, 1921  
Pope Yeatman, New York.....Retires January, 1921  
W. Lindgren, Cambridge, Mass.....Retires January, 1920

District 5—Pennsylvania.  
R. A. F. Penrose, Jr., Philadelphia.....Retires January, 1920

District 6—Ohio, West Virginia, Maryland, Virginia, North Carolina, District of Columbia, and New Jersey.  
R. M. Catlin, Franklin, N. J.....Retires January, 1920

District 7—Minnesota, Wisconsin, Michigan, Iowa, Missouri, Arkansas, and Kansas.  
E. B. Kirby, St. Louis, Mo.....Retires January, 1920

District 8—Colorado, Utah, and South Dakota.  
R. C. Gemmell, Salt Lake City, Utah.....Retires January, 1921

Districts 9-10—Northern California, Nevada, and Alaska.  
Albert Burch, San Francisco, Calif.....Retires January, 1920  
F. W. Bradley, San Francisco, Calif.....Retires January, 1921

District 11—Southern California, Arizona and Texas.  
Ralph Arnold, Los Angeles, Calif.....Retires January, 1922

District 12—Washington, Idaho, Oregon, Montana, and Western Canada.  
C. W. Goodale, Butte, Mont.....Retires January, 1922

## OFFICERS OF SECTIONS

| SAN FRANCISCO        | NEW YORK              | PHILADELPHIA     |
|----------------------|-----------------------|------------------|
| Frank H. Probert,    | S. H. Ball,           | R. H. Sanders,   |
| <i>Chairman.</i>     | <i>Chairman.</i>      | <i>Chairman.</i> |
| Edward Letts Oliver, | J. V. N. Dorr,        |                  |
| <i>Sec.-Treas.</i>   | <i>Vice-Chairman.</i> |                  |
|                      | F. F. Sharpless,      |                  |
|                      | <i>Sec.-Treas.</i>    |                  |

DOUGLAS, ARMITAGE & McCANN, New York, Counsel for the Society.

# Mining and Metallurgical Society of America

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Vol. XII, No. 1

January 31, 1919

Bul. 128

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## ANNOUNCEMENTS.

**Meetings of the Society.**—A full report of the proceedings of the annual meeting of the Society, held on January 14, 1919, appears in this issue. Both sessions were of importance—the business meeting at 2:00 p. m. because, in addition to the announcement of the newly-elected officers and councillors, certain amendments to the by-laws of the Society were offered for consideration, and the evening session because it was devoted to the constitutionally required address by the retiring president, W. R. Ingalls, and a message to the membership by H. H. Knox, president-elect.

The large number of members and guests who attended the annual dinner, which took place in the banquet-room of the Engineers' Club, to listen to Mr. Ingalls' discourse on "The Economic Duties of the Engineer" made this function especially noteworthy.

The successful ticket at the annual election follows: For President, H. H. Knox; for Vice-President, F. F. Sharpless; for Secretary-Treasurer, Louis D. Huntoon; and for Councillors, W. H. Aldridge, Ralph Arnold, C. W. Goodale, W. R. Ingalls, and J. E. Spurr, in their respective districts.

**New York Section.**—Because of the annual meeting of the whole Society, no meeting of this Section was scheduled for January. Announcement, however, is made that a session on Mine-Taxation will be held at the Columbia University Club on Thursday evening, February 27. A number of speakers have agreed to be present who will discuss this important subject in its legal aspect and from the standpoint of economics.

**Council.**—The postponed meeting of the Council was duly held on January 2, and the minutes are printed in this number. A meeting at short notice was held also on January 6, but, as the business was purely executive, its proceedings are not reported.



**Amendments to By-Laws.**—On page 27 of this issue of the BULLETIN will be found certain proposed amendments to the by-laws of the Society which were presented at the business session of the annual meeting. As explained by the President, these amendments in the main do not differ materially from those printed in BULLETIN No. 115, December, 1917, but on which final action was deferred.

As provided by the existing by-laws, these amendments have received the endorsement of the Council, and are now published in order that they may be thoroughly reviewed by the individual members. Not less than thirty days after the date of publication, a second meeting of the whole Society will be called for the further consideration of these amendments.

**Gold Medal.**—Announcement was made at the annual meeting that Charles Eugène Schneider of France had been awarded the Gold Medal of the M. M. S. A. for 1919, for "Distinguished Service in the Metallurgy of Iron and Steel." At the moment, no information can be given as to when and where the formal presentation of the medal will occur.

**Annual Election.**—While the subject is still fresh in mind, it is only proper that the members' attention should be called to the comparatively large proportion of ballots which, for one reason or another, were not included in the count of this year's election for officers and councillors.

It so happens that, in the annual election of 1918, similar conditions were encountered, and thus, in order to reduce errors in voting to a minimum in 1919, a ballot was prepared which carried not only the ticket but also an explanatory statement as to the method of voting.

Reference to the tellers' report, printed in this issue, will show that, of a total of 171 votes cast, 22 per cent. were faulty and were thrown out. In general, the errors occurred in the vote for councillors and apparently were due to the fact that the cumulative voting is not clearly understood. Instances were noted in which two nominees for a single vacancy had been voted for, and in many cases the total number of votes cast for councillors exceeded the total number of vacancies to be filled.

Members ought not to lose their votes, and especially not where it concerns their choice for councillors. The only remedy for this trouble is a careful reading of Article 10 of the by-laws.

**Membership List.**—A final call is here made for information as to changes of address, etc. During the month of March a cor-

rected list of the members will be prepared for publication. The assistance of the members is obviously essential.

**Bound Volumes.**—It may be supposed that members have placed orders for the bound volume of the 1918 BULLETIN when remitting their dues. If not, they should do so promptly; the Secretary does not carry a surplus stock on hand.

The Secretary's office has for sale one complete set, Vols. I to X, of the M. M. S. A. BULLETIN in bound form. Details will be supplied on application to the Secretary.

## COMMUNICATIONS.

**Labor Readjustment.**—Apropos of the general subject "Reconstruction," what George A. Laird has to say regarding the labor situation of today is interesting. Mr. Laird has had considerable practical experience as an employer and in his letter, printed below, he advocates a campaign of education to counteract unrest. He writes from Ray, Arizona, under date of December 30.

In the BULLETIN of November 30th, the various references to labor adjustments to be made since the conclusion of the war, have been of interest to me, as I have recently been in conversation with a number of mine employees who are wondering what is to happen to wages, and as to the possibilities of reduced working forces during the coming period of readjustment.

The better class of workingmen seem to feel that the most efficient workers have nothing to fear, but the agitator, the idler and the incompetent are arguing that a general reduction of operations is to be effected in all of the large copper mines in order to reduce wages and eliminate bonuses.

It is remarkable to me, that in view of the results obtained by "propaganda" that a more thorough campaign of enlightenment regarding the "After the War" conditions has not been promulgated by the mining companies. The man who reads a daily paper does not need as much education as to these conditions as the man who does not, and it is generally the man who does not read who spends his time in advancing the theories which cause dissension among the element who, illiterate or unable to read papers printed in English, are only too willing to listen, and too often agree.

Among almost all mine crews are men who stand well among their fellow workers, and who are able to address them in numbers. Why not institute "Four Minute Men" among these employees and let them talk to the men before they go to work—on company time—several times a week? Inefficiency and dissension are easily sown among the men around the time office, yet I know of not one case where the operations have openly instituted a campaign of education in the same place.

By this, I would not suggest that a speaker urge efficiency or anything else, but that he tell, in plain words, the result of the cessation of the manufacture of war materials, the difficulties of determining what is

essential in the reorganization which must take place, and the part that each can, will, or must play in the rehabilitation of the world's industries.

It is surprising how many mine workers keep posted on the stock market value of the mine in which they are working, on the profits made during a certain period, and of the market price of the mine's product. It would also seem to me to be of educational value if they could know, also, the relative costs per ton of their product in terms of labor and supplies, that is, per cent. of the cost of labor and per cent. in supplies, per man employed. Many miners think that production costs consist of their wages plus the General Manager's salary, and cannot see that the sum total of the two should make the product cost so much, even although no real General Manager is supposed to received less than a hundred thousand dollars per annum. A little more "inside information", which any engineer can figure for himself, with more or less accuracy, might be divulged so that the men may see that their wages do not constitute the whole cost of operations, but that their inefficiency does at times prove to be the last straw.

The oldtime bunk house, the company store, and many other objectionable features of the mining camp, have been eliminated, largely due to the efforts of the miners, themselves. Although educated to the betterment of their working conditions they have had no opportunity to learn what a small profit to their individual effort is accrued.

**Spanish Influenza.**—The letter of Dr. C. T. Baldwin which follows was addressed to C. R. Corning and carries date of January 14. It was transmitted to the Secretary by Mr. Corning because of the interest shown by the New York Section in the matter of combating this latest form of influenza, and as supplementing the discussion of its meeting in December.

The answer to your question about nausea excited in patients taking Calcreose solution would not be complete without telling you of some recent experiences.

The success continues in both influenza and pneumonia. It is an immense satisfaction to be able to give a family in poor circumstances, and without any care or nursing, something that will control and cure the infection in every case, old and young. In the country districts, miles from medical attendance, when doctors refuse to go when the roads are bad, I have been sending treatment by mail and given directions by telephone. For the most part, I rarely give anything but the solution, using hot or cold applications for pain. Heat for the very young or old, and cold for the plethoric.

I have not as yet found a case where nausea interfered with administration of the solution. Patients often object most strenuously to the taste but a little persuasion suffices. In one case at the hospital of double pneumonia, with a temperature of 105, and severe gastritis, the patient could not even retain water, vomiting everything. The case was going bad. I was called to see this case and the Calcreose solution promptly stopped the vomiting and the patient has made a good recovery.

You see, I can scarcely imagine a case when nausea would be an insuperable objection or resist a little persuasion, or gradually increased dosage. Of course such a case might arise, though not in my experience so far.

The tablets are nearly as effective as the solution against the infection, 2 to 4 of the tablets every 2 to 4 hours being then used.



I am very busy and have not yet seen a death from pneumonia in my practice. I still feel quite as confident as when I saw you that the general use of the solution by the public would stamp out the epidemic. The partial opposition of physicians prevents this. Also the pernicious paternalism in medicines which ignores anything not originating at established headquarters in Government or civil medicines. In spite of all this, I have the satisfaction of knowing that a great many lives have been and are being saved by this remedy. I have trouble, in some consultations, to persuade physicians to push the solution in severe cases. When the temperature goes up and the symptoms seem to increase, they often argue that the solution is not agreeing with the patient, erroneously thinking the solution is doing harm instead of the disease. Invariably by increasing the dosage I find the symptoms yielding. The only exception to this being in those cases past help. I have taken the solution every day for three months. During that time I have repeatedly observed serious symptoms of infection clear up most promptly in myself.

Thanking you for your assistance in giving the public the benefit of this prophylactic and remedy.

**U. S. Geological Survey.**—The members will recall that, both through the medium of the BULLETIN and by special notices sent out with the election ballots, they were urged to record with the Secretary any data which they might possess relative to mineral deposits in foreign lands. This campaign was undertaken at the request of J. B. Umpleby of the "Survey," and such information as has been accumulated by the Secretary has been promptly forwarded to Washington.

Early in January, in correspondence with Mr. Umpleby, the Secretary was advised that an important announcement with particular reference to this same question of foreign ore-bodies would be made by the Director of the U. S. Geological Survey himself. Thus, about the middle of January, the following communication from George Otis Smith was received:

Mr. Louis D. Huntton,  
New York City.

My dear Mr. Huntton:

In connection with a special investigation made during the last year the United States Geological Survey has accumulated data descriptive of the mineral deposits of the world, both developed and undeveloped. It is the purpose to continue the collection of information of this type in recognition of the present need to know better the mineral resources of the world with which our own mines are in competition and which also offer opportunity for investment of American capital and engineering talent.

The larger mining corporations and many mining engineers and geologists have already contributed generously to the Survey's file of digests of reports and it seems logical that the records thus obtained should be made available for those interested, but in view of the nature of the records and the continual additions made to them publication is not practicable, so the plan is to have these files open to all mining engineers and geologists who are studying the mineral resources of any country or district. Mr. J. B. Umpleby is the geologist in charge of the part of the Survey organization devoted to foreign mineral deposits and he may be consulted regarding

these files. It will also be a pleasure to me to correspond with you regarding the data the Survey already possesses on any district and especially regarding any contribution you or your associates may be able to make that would add to the value of these files. It is an opportune time for American mining men to pool their information, but any confidential data that the contributor may desire to be made use of only by Government geologists will continue to be so treated and not included in the open files.

I am of the opinion that our science must be put on a broader foundation if it is to be of greatest usefulness in furnishing facts to the builders of industry, and I have expressed my views in a recent paper which I take pleasure in enclosing, together with a companion paper by Dr. Leith on the international phase of mineral resources.

Yours cordially,

GEO. O. SMITH,  
*Director.*

It will therefore be seen that the material which has been gathered from many sources for the use of the Government will be available also to the engineering profession. And, as it may be supposed that new conditions will have a tendency to lead the American mining man further afield, to have this "data descriptive of the mineral deposits of the world" near at hand should prove of real benefit.

The two papers to which Dr. Smith alludes are entitled "The Economic Limits to Domestic Independence in Minerals," by himself and the "International Control of Minerals," by Dr. C. K. Leith—both should be read by every engineer.

**American Zinc Institute.**—The Secretary has received what is denoted the "1918 Bulletin" of the American Zinc Institute, which, to all intents and purposes, is simply an announcement of the contemplated activities of this organization. Whether other bulletins are to appear from time to time is not made clear. However, it is interesting to note what are the headings which specify the objects through which the A. Z. I. will "justify its existence"; these are, Acquaintanceship, Educating the Public in New Uses for Zinc, Establishing a Statistical Bureau, Increasing Largely the Exportation of Zinc, and Promoting Sound Economical Conditions in the Industry, etc.

This bulletin also records the motto of the A. Z. I., which is "Cooperation—Coordination," and, in a final paragraph, announces that a survey of domestic and foreign zinc is now under way, the results of which will be published as rapidly as the data are made available.

**U. S. Department of Labor.**—The activities of what was the Section on Industrial Training for the War Emergency of the Committee on Labor of the Council of National Defense have been taken

over by a division of the Department of Labor under the name of Training and Dilution Service. C. T. Clayton is director and H. E. Mills, chief of training.

Five bulletins have thus far been issued by the T. and D. Service, which should prove instructive and especially to those who have the efficiency of labor at heart. Bulletin No. 1 has "How to Start a Training Department in a Factory" for its title, and another (No. 4), "Training Employees for Better Production," covers many pertinent facts, perhaps particularly to be relied upon because they are deduced from actual experiences.

## ANNUAL MEETING.

### AFTERNOON SESSION.

January 14, 1919.

The annual meeting of the Mining and Metallurgical Society of America was called to order by the President, W. R. Ingalls, at 2:10 P. M. The roll-call having shown that one-third of the membership (103) was present in person, or by proxies represented by some attending member, as required by the constitution, the chair ruled that this constituted a quorum.

The members who were present at the meeting follow: S. H. Ball, C. R. Corning, L. C. Graton, Louis D. Huntoon, W. R. Ingalls, J. E. Johnson, Jr., H. H. Knox, J. Volney Lewis, W. Lindgren, A. C. Ludlum, D. A. Lyon, C. Seymour Newcomb, Robert Peele, Allen H. Rogers, F. F. Sharpless, George C. Stone, G. D. Van Arsdale and William Young Westervelt.

The President then announced that the first business before the meeting was to approve the minutes of the last annual meeting, January 8, 1918, which had been printed in Bulletin No. 116 for the benefit of all the members. On proper motion, the minutes received the approval of the meeting.

The next business before the meeting was to receive the report of the tellers, Messrs. Cornell and Rubidge, who had been appointed by the President as provided in the by-laws, on the annual election of officers and councillors. At the request of the President, the tellers' report and detailed schedule were then read by the Secretary, and follow:



# MINING AND METALLURGICAL SOCIETY OF AMERICA

Mr. W. R. Ingalls, President,  
Mining and Metallurgical Society of America,  
115 Broadway,  
New York City.

Dear Sir:—

The undersigned tellers appointed to count the vote for the election of officers and councillors at the Annual Meeting on January 14, 1919, beg to report that the following named nominees have received the highest number of votes for their respective offices:

H. H. Knox for President.  
F. F. Sharpless for Vice-President.  
Louis D. Huntoon for Secretary-Treasurer.  
W. R. Ingalls for Councillor, Districts 1-2-3-4.  
W. H. Aldridge for Councillor, Districts 1-2-3-4.  
J. E. Spurr for Councillor, District 5.  
Ralph Arnold for Councillor, District 11.  
C. W. Goodale for Councillor, District 12.

In the case of Districts 1-2-3-4, in which there are two vacancies for councillors, Mr. Ingalls received the highest and Mr. Aldridge the next highest number of votes, respectively.

We are pleased to submit herewith detailed schedule of the vote.

Respectfully yours,

F. T. RUBIDGE,  
RUSSEL T. CORNELL.

## SCHEDULE OF ELECTION.

|                                                          |     |     |
|----------------------------------------------------------|-----|-----|
| Total members entitled to vote .....                     |     | 296 |
| Total returns .....                                      |     | 171 |
| Ballots returned without signature .....                 | 5   |     |
| Ballots invalid for other reasons .....                  | 2   | 7   |
|                                                          |     | 164 |
| Ballots thrown out by tellers; due to faulty voting..... |     | 31  |
| Ballots counted .....                                    |     | 133 |
| <b>PRESIDENT.</b>                                        |     |     |
| H. H. Knox.....                                          | 120 |     |
| J. E. Spurr.....                                         | 1   |     |
|                                                          | 121 |     |
| Not voting .....                                         | 12  |     |
|                                                          | 133 |     |
| <b>VICE-PRESIDENT.</b>                                   |     |     |
| F. F. Sharpless.....                                     |     | 122 |
| Walter Douglas .....                                     |     | 1   |
|                                                          |     | 123 |
| Not voting .....                                         |     | 10  |
|                                                          |     | 133 |

## SECRETARY.

|                        |     |
|------------------------|-----|
| Louis D. Huntoon ..... | 121 |
| S. H. Ball .....       | 1   |
|                        | 122 |
| Not voting .....       | 11  |
|                        | 133 |

**COUNCILLORS, DISTRICTS 1—2—3—4.**

**(Two to be Elected.)**

|                         |    |                              |            |
|-------------------------|----|------------------------------|------------|
| W. H. Aldridge.....     | 31 | W. Lindgren .....            | 13         |
| S. H. Ball.....         | 18 | R. L. Lloyd.....             | 1          |
| J. Parke Channing.....  | 18 | W. W. Mein.....              | 7          |
| Walter Douglas .....    | 14 | Frank L. Nason.....          | 2          |
| H. A. Guess .....       | 5  | Robert Peele.....            | 4          |
| H. W. Hardinge.....     | 2  | R. M. Raymond.....           | 15         |
| Fred Hellmann .....     | 14 | Allen H. Rogers.....         | 10         |
| W. L. Honnold.....      | 9  | E. Gybbon Spilsbury.....     | 3          |
| W. R. Ingalls.....      | 74 | Bradley Stoughton .....      | 10         |
| J. H. Janeway.....      | 1  | J. H. Susmann.....           | 8          |
| Sidney J. Jennings..... | 9  | J. A. Van Mater.....         | 11         |
| J. E. Johnson, Jr.....  | 18 | Arthur L. Walker.....        | 6          |
| J. F. Kemp.....         | 10 | William Young Westervelt.... | 4          |
| A. R. Ledoux.....       | 10 |                              |            |
| Thomas H. Leggett.....  | 10 |                              | <b>337</b> |

**COUNCILLOR, DISTRICT 5.**

|                           |            |
|---------------------------|------------|
| H. M. Chance.....         | 26         |
| R. A. F. Penrose, Jr..... | 36         |
| J. E. Spurr.....          | 38         |
| Samuel A. Taylor.....     | 12         |
|                           | <b>112</b> |

**COUNCILLOR, DISTRICT 11.**

|                    |    |
|--------------------|----|
| Ralph Arnold ..... | 83 |
|--------------------|----|

**COUNCILLOR, DISTRICT 12.**

|                          |            |
|--------------------------|------------|
| Frederick Burbidge ..... | 22         |
| C. W. Goodale.....       | 89         |
|                          | <b>111</b> |

**SUMMARY OF VOTES FOR COUNCILLORS.**

|                               |            |
|-------------------------------|------------|
| Districts 1—2—3—4 .....       | 337        |
| District 5 .....              | 112        |
| District 11 .....             | 83         |
| District 12 .....             | 111        |
| Not voting .....              | 22         |
| 133 Ballots x 5 equal to..... | <b>665</b> |

The President thereupon declared that the candidates, whose names had been submitted by the tellers as those receiving the largest number of votes for their respective offices, had been elected. In the case of Districts 1—2—3—4, he announced that, in accordance with the ruling of the Council, W. R. Ingalls, as the recipient of the largest number of votes for councillor in those districts, was elected for the longer term, and W. H. Aldridge, with the next highest number, for the shorter term.

The report of the Secretary for the previous year was then called for by the President.

**REPORT OF THE SECRETARY FOR 1918.**

The work of the Society for the year has been devoted entirely to war problems, as is evidenced by the bulletins. A very large

percentage of the work has not, and could not appear in print; part of it was of a confidential nature in reply to inquiries from Washington. Your assistant secretary gave a large part of his time acting as secretary for the American Engineering Service, and at times the office of the Society impressed one as being an engineer's employment office for the War Department. Not only did we serve the War Department, but we co-operated with the Bureau of Mines in recommending engineers for special work; lists of engineers, especially qualified to do certain work, were furnished and the Secretary's office communicated with many of these engineers, advising them as to the work to be done and inviting their co-operation with the Bureau. Abroad we co-operated with, and were one of the American correspondents of, the Committee of American Engineers in London, likewise doing war work.

This work, and the publishing of the bulletins, was carried on entirely by your assistant secretary, Mr. Edward B. Sturgis. I wish to express my deepest appreciation, and the appreciation of the entire membership of the Society, for the untiring energy and devotion shown by him, not only in his work, but for his interest in the general welfare of the Society.

Our ballot for officers this year contains the name of one of our most active members; a man who has shown leadership and ability worthy of having conferred upon him the highest office in the Society; the New York Section will lose its chairman but not his co-operation; the Society, in turn, will secure a good leader in Mr. H. H. Knox, as its president for 1919. Likewise, we lose a President, a man who was Treasurer for seven years, following the organization of the Society, Secretary for four years, President in 1915, and again in 1917 and 1918. It has been my pleasure to serve as secretary under his able leadership. From the number of telephone calls received from your former President, offering suggestions and recommendations in connection with Society activities, I often wonder when he found time to sleep. I wish to express to Mr. Ingalls my appreciation of his interest in the welfare of the Society and my sincere thanks for his hearty co-operation with the Secretary's office.

Prior to the war, and prior to the organization of local sections by the A. I. M. E., your Society had three very active sections, where the same topics were discussed. The minutes of these meetings were edited by local secretaries and forwarded to the Society Secretary for publication. In recent years, the work of the Society has centralized more in your Secretary. The work planned for the current year is the appointment of various committees in connection with problems of reconstruction, and will probably be as



# MINING AND METALLURGICAL SOCIETY OF AMERICA

great, or greater, than it was in the past year. I recommend that the assistant secretary's office be maintained for the purpose of handling this work efficiently.

**Membership.**—At the annual meeting, January 8, 1918, the election to honorary membership of Professor James F. Kemp and Dr. James Douglas was announced.

The following twenty-six members were elected during the year:

|                        |                     |                       |
|------------------------|---------------------|-----------------------|
| Adkinson, Henry M.     | Hill, Rowland F.    | Rutherford, Forest    |
| Birkinbine, John L. W. | Judson, Wilber      | Smith, H. DeWitt      |
| Boyd, W. Sprott        | Langton, John       | Tuttle, Arthur L.     |
| Bridgman, G. Temple    | McDaniel, A. K.     | Watson, R. B.         |
| Burbidge, Frederick    | Martin, O. C.       | Watt, A. P.           |
| Chase, March F.        | Moore, Carl F.      | Weekes, Frederic R.   |
| Dorrance, Charles      | Newcomb, C. Seymour | Witherell, Charles S. |
| Douglas, James (Hon.)  | Nichols, C. W.      | Wolf, Harry J.        |
| Emery, A. B.           | Provot, F. A.       |                       |

We have lost from our membership by death the following:

|               |                |
|---------------|----------------|
| James Douglas | William Hague  |
| H. W. DuBois  | John D. Irving |

Three members were dropped for non-payment of dues for the years 1916, 1917 and 1918. Fourteen members have resigned during the year, and there are three resignations in the Secretary's hands, received late in December.

Following are the membership statistics since the organization of the Society:

| One Year<br>to               |         |      |          |         |          | Total<br>Membership | Candidates        |                   |                   |       |
|------------------------------|---------|------|----------|---------|----------|---------------------|-------------------|-------------------|-------------------|-------|
|                              | Elected | Died | Resigned | Dropped | Net Gain |                     | Before<br>Council | Before<br>Society | Applica-<br>tions | Total |
| June 1, 1908—Charter members |         |      |          |         |          | 115                 | ..                | ..                | ..                | ..    |
| Jan. 1, 1909                 | 31      | 0    | 1        | 0       | 30       | 145                 | ..                | ..                | 20                | 20    |
| Jan. 1, 1910                 | 27      | 1    | 8        | 0       | 18       | 163                 | 3                 | ..                | 9                 | 12    |
| Jan. 1, 1911                 | 31      | 2    | 3        | 2       | 24       | 187                 | 8                 | 5                 | 6                 | 19    |
| Jan. 1, 1912                 | 49      | 6    | 1        | 0       | 42       | 229                 | 3                 | 2                 | 11                | 16    |
| Jan. 1, 1913                 | 13      | 2    | 6        | 0       | 5        | 234                 | 0                 | 1                 | 2                 | 3     |
| Jan. 1, 1914                 | 10      | 3    | 3        | 1       | 3        | 237                 | 6                 | 4                 | 6                 | 16    |
| Jan. 1, 1915                 | 34      | 3    | 7        | 0       | 24       | 261                 | 2                 | 0                 | 10                | 12    |
| Jan. 1, 1916                 | 24      | 4    | 8        | 2       | 10       | 271                 | 2                 | 4                 | 7                 | 13    |
| Jan. 1, 1917                 | 22      | 6    | 1        | 4       | 11       | 282                 | 3                 | 0                 | 3                 | 6     |
| Jan. 1, 1918                 | 24      | 2    | 3        | 0       | 19       | 301                 | 3                 | 6                 | 2                 | 11    |
| Jan. 1, 1919                 | 26      | 4    | 14       | 3       | 5        | 306                 | 4                 | 5                 | 0                 | 9     |
| Totals                       | 291     | 33   | 55       | 12      | 191      | 306                 | ..                | ..                | ..                | ..    |

**Gold Medal.**—The medal of the Society, awarded at the annual meeting of January 8, 1918, to Mr. Pope Yeatman for "Distinguished Service in the Administration of Mines," was presented to Mr. Yeatman at the Columbia University Club on the evening of March 21, 1918. The Committee on Arrangements consisted of Mr. Yeatman's associates in South Africa, with Mr. H. H. Webb as its chairman.

**Meetings of Council and Executive Committee.**—During the year the Council held eight meetings and the Executive Committee two meetings.

**Society Meetings.**—The annual meeting of the Society was held at the Engineers' Club on January 8, 1918. On April 18, a general meeting of the Society was held at the Columbia University Club to consider amending the by-laws, and to discuss the draft of a minerals-control bill submitted to the Society by the War Minerals Committee.

**Section Meetings.**—The New York Section held its regular monthly meetings at the Columbia University Club. The House Committee of the club has very kindly extended the use of the club house and its facilities to the Society. Members of the Society attending the meetings have been granted guests' privileges at the time of such meetings, and rooms may be secured or supplies purchased.

At the call of the President, the San Francisco Section held a meeting on April 18 to discuss the draft of a minerals-control bill submitted to the Society by the War Minerals Committee.

**Counsel.**—From time to time, the Council desires legal advice and, on invitation of the Council, the firm of Douglas, Armitage & McCann agreed to act as our attorneys.

**Formal Actions.**—Two formal actions have been taken by the Society during the year. At the annual meeting January 8, 1918, Mr. A. H. Rogers presented a resolution to the effect that the 8 per cent. tax on professional incomes in excess of \$6,000 is an injustice. The resolution was referred to the Council and to a referendum vote of the membership on March 13; thirty days later, the vote was polled in favor of the resolution, and the President declared the resolution an Act of the Society. On May 21, copies of the resolution were mailed to the proper authorities in Washington, and were duly acknowledged.

In February, the War Minerals Committee, of which Mr. Westervelt was chairman, requested that the Society express an opinion regarding the advisability of Congress acting favorably on the

appointment of an administrator for the mineral industry. A copy of the proposed bill, together with correspondence, was published as a supplement to BULLETIN No. 117, and mailed to the membership, with request that it should be studied and opinion expressed. Meetings of the three sections were called by the President, and the Secretary urged members in other cities to call informal meetings of engineers to express opinions.

A large number of suggestions were received by the Secretary and published in the BULLETIN. At the New York Section meeting, held April 18, a resolution was adopted and referred to the Council for a referendum vote. The referendum vote was mailed to the membership on May 31 and polled on July 1 in favor of the resolution; at the Council meeting, held on July 9, the President declared it an Act of the Society, and on July 11 copies of the resolution were mailed to the proper authorities in Washington, and were duly acknowledged.

**Honor Roll.**—The Society can look upon its Honor Roll with pride. Most of the members who have been in service during the war are beyond the draft age and therefore were volunteers. Many members enlisted in the United States or Allied forces, and others served the Government in one capacity or another in connection with war matters.

The following list contains the names of our members who have given part or their entire time to the Government in assisting to win the war:

Lawrence Addicks.....Member, U. S. Naval Consulting Board  
 Ralph Arnold.....Member, Board of Tax Reviewers  
 Percy E. Barbour.....Capt., Engineer Corps  
 Edwin S. Berry.....Capt., 27th Engineers  
 Reginald W. Brock.....Major of Canadian forces  
 Alfred H. Brooks.....Lt. Col., Engineer Corps, A. E. F.  
 Gelasio Caetani.....Capt., 1st Reg. of Engineers, Italian Army  
 M. F. Chase.....Dir. Explosives Division, War Ind. Board  
 C. R. Claghorn.....Lt., U. S. Naval Reserve Force  
 J. Morgan Clements.....Bur., Foreign and Domestic Commerce  
 Welton J. Crook.....Officers' Training Camp  
 Benedict Crowell....Major, Eng. Corps; Asst. Secretary of War  
 W. B. Devereux, Jr. ....Capt., Aviation Sec., Signal Corps  
 J. S. Douglas....Maj. and Dir. Warehouses, American Red Cross  
 Francis Drake.....British Aircraft Production Department  
 A. S. Dwight.....Major, 11th Engineers, A. E. F.  
 Baird Halberstadt....Fed. Fuel Administrator, Schuylkill Co., Pa.  
 W. L. Honnold.....Am. Dir., Com. for Relief in Belgium



## MINING AND METALLURGICAL SOCIETY OF AMERICA

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|                              |                                               |
|------------------------------|-----------------------------------------------|
| Herbert C. Hoover.....       | U. S. Food Administrator                      |
| D. C. Jackling.....          | Dir., U. S. Explosives Plants                 |
| Donald M. Liddell.....       | Capt., Aviation Sec., Signal Corps            |
| Halstead Lindsley.....       | Major, Ordnance Corps                         |
| J. F. McClelland.....        | Chief, Prod. Eng., Bur. Aircraft Prod.        |
| Charles W. McMeekin.....     | Major, General Staff                          |
| C. H. Macnutt.....           | Lt. of Engineers in Canadian forces           |
| B. Magnus.....               | Capt., Engineer Corps                         |
| W. W. Mein.....              | Assistant Secretary of Agriculture            |
| C. W. Merrill.....           | Div. of Chemicals, U. S. Food Administration  |
| H. G. Moulton.....           | Engineer, War Industries Board                |
| Seeley W. Mudd.....          | Col. and Asst. Dir., U. S. Explosives Plants  |
| O. B. Perry.....             | Lt. Col., 27th Engineers                      |
| Joseph Hyde Pratt.....       | Col., 105th Engineers, A. E. F.               |
| A. L. Queneau.....           | Officer Interpreter, French Army              |
| M. L. Requa.....             | Chief of Oil Div., U. S. Fuel Administration  |
| Edgar Rickard.....           | U. S. Food Administration                     |
| A. P. Rogers.....            | Materials Dept., Signal Corps                 |
| W. L. Saunders.....          | Chairman, U. S. Naval Consulting Board        |
| Stanley C. Sears.....        | Capt., Engineer Corps                         |
| Millard K. Shaler.....       | Hon. Sec., Com. for Relief in Belgium         |
| J. E. Spurr.....             | U. S. Shipping Board                          |
| George C. Stone.....         | War Industries Board                          |
| H. H. Stout.....             | Lt. Col., Ordnance Corps                      |
| S. A. Taylor.....            | Tech. Advisor, U. S. Fuel Administration      |
| S. C. Thomson.....           | War Export Board                              |
| Arthur L. Walker.....        | Con. Met. to Chief of Ordnance, U. S. A.      |
| R. G. Wayland.....           | Lt., Engineer Corps                           |
| William Young Westervelt.... | Chairman, War Minerals Committee              |
| Pope Yeatman....             | Chief, Non-Ferrous Metals Sec., War Ind. Brd. |

The above list totals 48, or 15 per cent. of the entire membership.

**War Service.**—Your Assistant Secretary, Mr. Sturgis, has followed the war work in detail and I have requested him to prepare a report on this subject for you as he is more familiar with it than I.

LOUIS D. HUNTOON,  
*Secretary.*

December 31, 1918.

In emphasizing what the Secretary had reported relative to the war service of the Society, the President stated that, in his own

knowledge, a good deal had been done which could not well have been made matters of formal record, and cited one instance as an example. The report of the Secretary was then accepted by motion duly made, seconded and carried.

The chair then announced that the Treasurer's report was next in the order of business.

### REPORT OF THE TREASURER FOR 1918.

In submitting the following annual report I wish to call to the attention of the members the fact that with a paid assistant secretary to look after the detail work, and to follow up and carry to completion suggestions offered by your President and members of the Society, the Society has been able to accomplish results this past year in connection with Government requirements, and war work in particular, which are a credit to the Society, and of which all the members may be proud.

The amount of work which the Society can do depends upon the amount of available money to back up such work. We have big reconstruction problems ahead of us directly affecting the mining and metallurgical industries and for the Society to assist in handling these problems satisfactorily a paid assistant secretary is essential. The present dues of \$20.00 per year, or an increase of 150 per cent. in the membership will accomplish this. I therefore recommend that the dues be continued at \$20.00 until such time as we have enrolled on our member-list 700 to 800 names. To meet the increased expense due to the war, the dues were raised from \$10.00 to \$20.00 for the period of the war and one year thereafter.

The Treasurer's statement follows:

#### RECEIPTS.

|                                          |          |            |
|------------------------------------------|----------|------------|
| Cash on hand, January 1, 1918.....       |          | \$1,169.22 |
| Annual Dues, 1917.....                   | \$35.00  |            |
| Annual Dues, 1918.....                   | 5,790.00 |            |
| Annual Dues, 1919.....                   | 30.00    |            |
|                                          |          | 5,855.00   |
| Sale of Bound Volumes, back numbers..... | \$1.97   |            |
| Sale of Bound Volumes, 1917.....         | 258.00   |            |
| Sale of Bound Volumes, 1918.....         | 1.50     |            |
|                                          |          | 261.47     |
| Local Section Loan returned.....         |          | 100.00     |
| Interest .....                           |          | 54.80      |
| Special Meetings .....                   |          | 81.87      |
| Gold Medal Dinner .....                  |          | 600.00     |
| Annual Meeting Dinner .....              |          | 98.05      |
|                                          |          | \$8,220.41 |

# MINING AND METALLURGICAL SOCIETY OF AMERICA

## EXPENSES.

|                                             |            |            |
|---------------------------------------------|------------|------------|
| Assistant Secretary .....                   | \$2,400.00 |            |
| Office Rent and Stenographer.....           | 1,781.00   |            |
| Office Expenses: Stationery, etc.....       | 680.12     |            |
| Office Furniture .....                      | 16.50      |            |
|                                             |            | \$4,877.62 |
| Annual Medal, 1918.....                     | \$107.30   |            |
| Annual Medal, 1919.....                     | 19.58      |            |
|                                             |            | 126.88     |
| Annual Meeting, 1918.....                   | \$138.52   |            |
| Annual Meeting, 1919.....                   | 37.28      |            |
|                                             |            | 175.80     |
| Special Meetings .....                      |            | 70.62      |
| Gold Medal Dinner .....                     |            | 583.66     |
| Exchange .....                              |            | 1.15       |
| Binding Volumes, 1917 .....                 |            | 315.06     |
| Bulletins .....                             |            | 1,407.61   |
| Copies of Constitution and By-Laws.....     |            | 91.55      |
| New Members .....                           |            | 72.80      |
| Local Section Expenses .....                |            | 35.46      |
| War Committee of Technical Societies .....  |            | 45.30      |
| Income Tax Referendum .....                 |            | 8.20       |
| Administration of Minerals Referendum ..... |            | 67.52      |
| Cash in Bank January 1, 1919.....           |            | 341.18     |
|                                             |            | \$8,220.41 |

Assets and liabilities January 1, 1919, are as follows:

## ASSETS.

|                                                   |          |
|---------------------------------------------------|----------|
| Cash in Bank .....                                | \$341.18 |
| Dues Payable, 1918.....                           | 190.00   |
| Office Furniture and Fixtures .....               | 66.50    |
| 1 Bond: New York City 4½ per cent., \$150.00..... | 147.75   |
| 2 Society Badges .....                            | 10.00    |
| Payment for account of Annual Medal, 1919.....    | 19.58    |
| Payment for account of Annual Meeting, 1919.....  | 37.28    |
| Interest accrued .....                            | .34      |
|                                                   | \$812.63 |

## LIABILITIES.

|                                             |          |
|---------------------------------------------|----------|
| Life Membership .....                       | \$150.00 |
| Payment in advance for dues, 1919.....      | 30.00    |
| Payment in advance Bound Volumes, 1918..... | 1.50     |
| Estimate of cost of December Bulletin ..... | 100.00   |
| Estimate of unpaid bills .....              | 50.00    |
|                                             | \$331.50 |

The above accounts have been audited and final entries made in the ledger by Mr. Charles T. Howell, as has been the custom. Following is copy of Mr. Howell's letter:



# MINING AND METALLURGICAL SOCIETY OF AMERICA

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December 31, 1918.

To the President and Councillors of the  
Mining and Metallurgical Society of America,  
New York City.

Gentlemen:

Acting under appointment by the treasurer of the Society, I have audited the accounts of the Mining and Metallurgical Society of America for the year 1918, and hereby certify that, to the best of my knowledge and belief, the statement of the receipts and disbursements are correctly set forth and that the balance sheet presents the true financial condition of the Society.

Respectfully,

CHARLES T. HOWELL,  
*Auditor.*

Following is an analysis of some of the individual accounts:

|                                                                                 |         |         |
|---------------------------------------------------------------------------------|---------|---------|
| January 1, 1918, dues in arrears for 1916.....                                  | \$30.00 |         |
| January 1, 1918, dues in arrears for 1917.....                                  | 65.00   |         |
|                                                                                 |         | \$95.00 |
| Dues collected for 1917.....                                                    | \$35.00 |         |
| 3 members dropped; Dues for 1916 and 1917 charged to<br>loss and gain a/c ..... | 60.00   |         |
|                                                                                 |         | \$95.00 |

The bound volume account, not including the cost of printing the extra bulletins necessary for binding or the cost of printing the index, has always shown a slight profit. As there are no requests for the index by members, your Treasurer has charged the cost of indexing for the 1917 BULLETIN to the Bound Volume Account. The following statement of the Bound Volume Account for the 1917 bulletins shows a loss of \$45.06:

|                                                    |          |          |
|----------------------------------------------------|----------|----------|
| Cost of Index and Title Page.....                  | \$ 35.50 |          |
| Cost of binding 190 vols. @ \$1.34.....            | 254.40   |          |
| Distributing .....                                 | 25.16    |          |
|                                                    |          | \$315.06 |
| Total cost 190 vols. @ \$1.66.....                 |          |          |
| January 1, 1918, Credit on 1917 Bound Volumes..... | \$ 12.00 |          |
| December 31, 1918, Received during 1918.....       | 258.00   |          |
|                                                    |          | \$270.00 |
| Total Credits .....                                |          | \$45.06  |

Bids for the binding of the 1918 bulletins were requested early in December; only one bid at \$2.50 has been received; other binders have refused to bid, or make any rough estimate, until after the first of the year. The bills will be mailed by your Treasurer with a charge of \$2.00 for the bound volume, with the hope that he can obtain a bid below this figure.

**Dues for 1918.**—The following statement covers the dues for which the Treasurer is liable and his accounting for same:

# MINING AND METALLURGICAL SOCIETY OF AMERICA

At the close of 1917 we had listed 301 members from which number we must deduct four resignations as of December 31, 1917, and one member transferred to Honorary membership, leaving:

|                                             |          |            |
|---------------------------------------------|----------|------------|
| 296 Members to be accounted for.....@       | \$20.00  | \$5,920.00 |
| 22 Members elected.....@                    | 20.00    | 440.00     |
| 3 Members elected.....@                     | 10.00    | 30.00      |
| <hr/>                                       |          |            |
| 321 Members: Total to be accounted for..... |          | \$6,390.00 |
| Dues paid in advance.....                   | \$ 40.00 |            |
| Dues received during 1918.....              | 5,790.00 |            |
| <hr/>                                       |          | \$5,830.00 |
| Dues remitted, 12.....@                     | \$20.00  | \$ 240.00  |
| Dues remitted, 1.....@                      | 10.00    | 10.00      |
| Resignations as of July 1, 4.....@          | 10.00    | 40.00      |
| Life member, 1.....@                        | 20.00    | 20.00      |
| Dropped for non-payment, 3.....@            | 20.00    | 60.00      |
| <hr/>                                       |          | 370.00     |
| Dues arrears, 8.....@                       | 20.00    | 160.00     |
| Dues arrears, 3.....@                       | 10.00    | 30.00      |
| <hr/>                                       |          | 190.00     |
| <hr/>                                       |          |            |
| Total accounted for.....                    |          | \$6,390.00 |

The four resignations recorded as of December 31, 1917, were received after the Treasurer had balanced his books early in December.

**Medal Presentation Dinner.**—Following is a detailed statement of receipts and expenses of the Medal Presentation Dinner. The cost of the dinner ticket to members must, of course, carry with it guests of the Society and other expenses directly chargeable.

|                                             |          |
|---------------------------------------------|----------|
| 120 Tickets sold @ \$5.00 .....             | \$600.00 |
| Printing Notices .....                      | \$10.50  |
| Printing Menu .....                         | 12.75    |
| Printing Tickets .....                      | 4.75     |
| Printing Seating Lists.....                 | 8.75     |
| Menu Die .....                              | 11.25    |
| <hr/>                                       |          |
| Postage .....                               | \$48.00  |
| Special Stenographer .....                  | 9.70     |
| Reporting Meeting .....                     | \$18.00  |
| <hr/>                                       |          |
| Petty Cash Expenses.....                    | 30.00    |
| Columbia University Club, 122 @ \$3.50..... | 5.60     |
| Flowers and sundry club expenses .....      | \$427.00 |
| <hr/>                                       |          |
| Returned checks for 3 tickets .....         | 57.15    |
| <hr/>                                       |          |
| Balance credited to Annual Medal a/c .....  | 484.15   |
| <hr/>                                       |          |
|                                             | 15.00    |
|                                             | 7.55     |
| <hr/>                                       |          |
|                                             | \$600.00 |

**Bulletins.**—It will be noted that the total expenditures chargeable to bulletins, cost of printing and distributing, is \$1,407.00, as compared with \$868.00 for 1917, or more than 50 per cent. higher than in 1917. This is not due to increase in the cost of printing as we had a most favorable printing contract. The increased cost is due to your active Assistant Secretary, Mr. Edward B. Sturgis, who has followed the office correspondence closely and advised you fully regarding the activities of the Society. The bulletins for 1917 contained a total of 278 pages, whereas the 1918 bulletins will contain about 400 pages.

**Office Expenses.**—The office expenses comprise such items as general postage, small printing bills for which special accounts have not been opened, stationery, telephone and telegraph, and general supplies. It does not include postage for the bulletins, which expense is charged directly to the Bulletin Account. The total charge may be divided as follows:

|                                                  |          |
|--------------------------------------------------|----------|
| Stationery, letter-heads and envelopes.....      | \$112.00 |
| Telephone and telegraph.....                     | 134.00   |
| General office postage.....                      | 121.00   |
| Extra stenographer during year.....              | 122.00   |
| Cables, postage (special war work).....          | 20.00    |
| Auditing accounts .....                          | 50.00    |
| Printing, office supplies, general expenses..... | 121.12   |
|                                                  | <hr/>    |
|                                                  | \$680.12 |

**Referendum Votes.**—These accounts cover printing, postage, telegraph, etc., and may be subdivided as follows:

|                                            |         |
|--------------------------------------------|---------|
| Income Tax Referendum .....                | \$ 8.20 |
| Administration of Minerals Referendum..... | 67.52   |
|                                            | <hr/>   |
|                                            | \$75.72 |

**Constitution and By-Laws.**—The account "Constitution and By-Laws," which includes the list of members, shows a slight decrease in cost. This is due to the printing of a separate member-list which did not include the Constitution and By-Laws.

**Annual Meetings.**—In this account, is included printing and postage in connection with the election of officers, the call of the meeting, reporting the meeting, and general expense of the meeting.

**New Members.**—This account covers printing of lists only, and amounts to \$72.80, or \$2.91 per member elected, as against a cost of \$2.64 per member elected in 1917.

LOUIS D. HUNTOON,  
*Treasurer.*

December 31, 1918.



The Treasurer's report having been accepted and ordered on file by regular procedure, the President called for the report of the Assistant Secretary.

### REPORT OF THE ASSISTANT SECRETARY FOR 1918.

#### Government War Service.

The Secretary has stated in his report that the activities of the Society during the year have, in very large part, been devoted to Government war service, and, in this connection, he has pointed out that the pages of the BULLETIN testify to this fact. In this latter statement, it may be presumed that the Secretary refers to the BULLETIN not only as it has recorded the actual proceedings of the Society, but also has in mind the publication in it of numerous announcements, communications, etc., which form indirectly a portion of the Society's war work.

Before analyzing the war service of the Society, it may be well to recall one remark of your President made in his last annual address, to the effect that, during the eight months (in 1917) just preceding, although many things contemplated had not been done, other things of importance, which had not been foreseen, had been accomplished. Thus, it will be noted in what follows, that no mention is made of the Classification of Engineers, Register of Mineral Properties, and kindred subjects, which were reported upon a year ago, and that, in their stead, other kinds of service are enumerated.

**Honor Roll.**—Although the readers of the BULLETIN are doubtless familiar with the very creditable showing made by the list of members in service, something further should perhaps be said as to details. The Honor Roll of the Society, comprising the names of 36 members in December, 1917, has made a net increase of 12 during the year. In this time, four names only have disappeared from the list; two by resignation and, it is a sorrowful duty to state, two—Lieutenant William Hague and Captain John Duer Irving—by death at the front.

It is difficult to select names for special mention, but it may be recorded here that the Honor Roll includes the names of two colonels, Mudd and Pratt, and two lieutenant-colonels, Brooks and Stout, all advanced to this rank in 1918. Then, in addition to an Assistant Secretary of War, the Society now has an Assistant Secretary of Agriculture in W. W. Mein. What Hoover, Jackling, Requa, Rickard, Spurr and Yeatman, have done, and are doing, is public knowledge.

There is also a supplementary list of members—certainly one-half as many again—whose names do not appear as a part of the printed roll, but who have, nevertheless, given a helping hand to the Government. Not including those who, in normal times, have acted in a consulting capacity to the U. S. Bureau of Mines, or those who have been giving of their time similarly, during the war months, the Society has been well represented in Washington and elsewhere by members whose names have not appeared on the published Honor Roll. Burch, J. E. Johnson, Jr., and others, are members of the War Minerals Investigation, of which J. E. Spurr is the executive; Stoughton is Chairman of the Committee on Metallurgy of the National Research Council; Burbidge, Fitch, Gottsberger, and Sharwood are furlough certifying officers; and Hennen Jennings is at the head of the committee on gold production.

Other members naturally have been doing their share by serving on Draft Boards, on Liberty Loan committees, etc. Also those members whose service has been of an advisory capacity should not be forgotten, and in this respect your President has been called to Washington a number of times to give expert advice, notably in the case of the minerals control legislation.

**Committees for War.**—The connection of the Society with the War Minerals Committee, of which William Young Westervelt is chairman and the representative of the Society, has been told by the Secretary in sufficient detail up to the time when the authorities in Washington were notified of the final action of the Society. It only remains to add that the officers of the Society were continually in touch with the situation until the minerals control bill had been signed, and that every effort was made to keep the membership informed through the medium of the *BULLETIN* as to the progress of this measure.

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In July the President was authorized by the Council to appoint a committee to co-operate with the American Mining Congress, and other organizations, to represent the mining industry in the matter of mine taxation, with especial reference to the revision of the war revenue act. The Secretary's office, also, has been in communication with the executive of the A. M. C. and the counsel of the Society have been called upon for advice.

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With the beginning of 1918, the War Committee of Technical Societies of the Engineering Council, under the leadership of D. W. Brunton, became in every way more active, and the Secretary was kept at all times advised by either Mr. Corning or Mr. Stone, who represented the Society on this Committee, of these activities. Mr.

Kirby, who was very largely responsible for the creation of the W. C. T. S., also was helpful in this respect.

Early in its existence, the W. C. T. S. became affiliated with the Naval Consulting Board, even to the extent of sharing its New York office on Park Row, but it was not until the spring of 1918 that the War Department recognized the value of this Committee's work. Still later, on the formation of an Inventions Section of the General Staff, the association between the War Department and the W. C. T. S. became closer, and a liaison officer was appointed and was made secretary of the Committee. Furthermore, a Washington office was opened in September.

The Society was called upon to issue the *Bulletins* of the W. C. T. S. to the membership, which was done in the case of Nos. 2 and 3, and finally in October the Society published, in its own BULLETIN, descriptive memoranda of certain "Invention Problems" which presumably took the place of *Bulletin* No. 4 of the W. C. T. S. Also, at the request of Mr. Brunton, the Secretary prepared a list of specialists to whom war problems might be sent for solution; and the Council authorized a small contribution to assist in defraying the expenses of the W. C. T. S.

The War Committee of Technical Societies was dissolved on December 31; copy of the final reports and minutes are on file at the M. and M. Society headquarters.

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As in the case of the War Committee of Technical Societies, the American Engineering Service of the Engineering Council began a more active career with the advent of 1918, because not until that time were funds made available. Whatever may have been the contemplated functions of this body it became soon evident that its work would consist very largely in supplying the Government with engineers for war service, and there seems but little question that this work was, on the whole, well done.

Generally speaking, the names of engineers were forwarded only on requisition from some department of the Government, and, in by far the greatest number of cases, engineers with special qualifications were specified. No very accurate records were kept until the establishment of headquarters in April, 1918, but it is safe to say that the A. E. S. was responsible for the sending in of the names of 4,000 engineers prior to that month. After April 1, and until its abolishment on November 21, actual figures show that the A. E. S. supplied the Government with the names of available engineers at the rate of 500 per month, or a total of 3,840. This total was in reply to 200 requisitions of all kinds.



What proportion of these totals received appointment it is impossible to state, at least at this time. However, in the case of two requisitions it is known that better than 60 per cent. were provisionally accepted, which may be considered fairly creditable.

The labor involved in this work was, as may well be imagined, very considerable, and it was found necessary to form a small staff to handle routine matters. W. V. Brown was made principal assistant and conducted the affairs of the A. E. S., under the direction of the Committee, in a most able manner. This Society was represented on the A. E. S. by your Assistant Secretary, and as he eventually became secretary of the latter, much of the executive work fell upon his shoulders, although his presence fortunately was not often required at A. E. S. headquarters. George J. Foran, the Chairman, also devoted much time to A. E. S. activities, as did the other members of this Committee.

In normal times the functions of an organization such as the A. E. S. could only be similar to those of an employment agency, and, as a central co-operative employment bureau for engineers had been to some extent under contemplation, on the completion of its war work, the A. E. S. was dissolved, and its staff, files, etc., were taken over by the secretaries of the founder societies, acting as a board of managers for the "Engineering Societies Employment Bureau."

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The connection of the Society with the American Committee of Engineers in London commenced in the fall of 1917, and developed later in its becoming a New York correspondent of this body of engineers. At its request, your President in January appointed a committee, consisting of Messrs. Ball, Hutchins and Knox, to give consideration to a "Project for Increasing Grain and Food Products in Eastern Siberia." The subject being one outside of the province of the Society, the committee reported to that effect, copies of its report being sent to the Department of State and to the A. C. E. L.

In September C. W. Purington, the then Chairman of the A. C. E. L., arrived in New York, and, at a very interesting meeting of the New York Section in his honor, told the members present much regarding the personnel and accomplishments of his Committee at first hand.

It was, moreover, the A. C. E. L. which was instrumental in interesting the Society in the cause of the "Crippled American Soldier." On the receipt, in January last, of a letter from the chairman of a sub-committee devoted to this work, the Secretary at once brought the matter to the attention of the Council, which by resolu-

tion gave him authority to interest others in the subject of employing disabled soldiers returning from the front.

From that time, for a matter of three months, the Secretary conducted a campaign of correspondence with those who had made the rehabilitation of the permanently injured a special study, and it may be supposed that an effort of this character leads to beneficial results. Certainly, at the very beginning this campaign was undoubtedly worth while, because but little publicity had been given to the subject. Later, however, the situation relative to the Crippled American Soldier was being thoroughly discussed, and finally it seemed apparent that the Government itself had the matter well in hand.

**Publicity Work.**—Under this heading are included certain matters which, though not directly connected with the proceedings of the Society, were, nevertheless, given space on the pages of the BULLETIN. As a general thing, these matters were brought to the attention of the Secretary through communications, and all had some direct bearing on the war. Thus, the National War Savings Committee, the Navy Department in behalf of the "Eyes of the Navy," the Oil Conservation Division of the U. S. Fuel Administration, the Pulp and Paper Section of the War Industries Board, and the Fund for War Devastated Villages, all called on the Society to assist in giving publicity to the causes for which they were initiated. In the latter case, it will not be amiss to state that A. H. Wethey, a member of the Society, has charge of one phase of the work still being carried on—the reconstruction of homes in devastated France.

In three of these instances, the Secretary not only gave timely publicity through the medium of the BULLETIN, but also aided by sending out literature to the members to give greater emphasis to the campaigns in question.

Again, the BULLETIN carried to the membership announcements from the Signal Reserve Corps, the Chief of Engineers, U. S. A., and the Navy Mobilizing Inspector, calling for volunteers. Here the hope was that, even though the members should not be qualified to volunteer, the word would be passed along.

**War Taxation.**—The action of the Society in the matter of the super tax on professional incomes is covered by the Secretary's report, and mention in reference to the war taxation of mines has been made above.

**New York Section.**—It should be noted that the meetings during 1918 of this Section have been devoted, in a very large

degree, to war subjects. One meeting was entirely given over to a discussion of the minerals-control legislation, and at one, Major Bashford Dean gave an interesting talk on armor with especial reference to the metals in use for this purpose today. At still another meeting, of which some mention has already been made, Messrs. Brunton and Purington described the war activities of their respective committees.

Under the program now in force, "Reconstruction" was the subject for consideration at the November meeting. In this connection, at the suggestion of your President, the Council has given authorization to the Executive Committee to initiate committees for the purpose of making a general survey of the mineral industry and to gather facts for eventual publication. The character and personnel of some of these committees has already been determined upon.

**U. S. Geological Survey.**—With the election ballots, the Secretary mailed printed notices requesting the members, on behalf of the Geological Survey, to inform his office as to their knowledge regarding mineral districts, or individual mineral deposits, located in countries outside of the United States. A fair number have thus far replied, and the information conveyed has been tabulated and sent on to Washington.

**U. S. Bureau of Mines.**—In July, a request was received from the Bureau of Mines for the names of engineers, who were prepared to make examinations of mineral properties for the War Minerals Investigation, which had then been inaugurated. Such a list was drawn from the classification of engineers which had been undertaken by the Society one year before, and sent forward.

### **Standardization Committee.**

This Committee was called upon by the Council to give due consideration to a report submitted by the American Society for Testing Materials on "Magnification Scales for Mimeographs." Through its Chairman, C. R. Corning, the committee recommended the endorsement of the definitions and rules embodied in this report.

### **Glossary of Terms.**

The assistance of the Secretary's office has been requested by Albert H. Fay, of the U. S. Bureau of Mines, in the preparation of "A Glossary of the Mining and Mineral Industry." More particularly is help needed in the reading of proof, in supplying better definitions and in remedying omissions. As such work is very slow-going, no great progress can be as yet reported.



**Bulletin and Year Book.**

Including the supplement in February, devoted to the minerals-control measure, the BULLETIN for 1918 exceeded in size that of the year before by more than 125 pages. No detailed comparison has been made, but the increase is without doubt due to the war activities of the Society which have been made of record on the pages of the BULLETIN. Every effort has been made to keep the subject matter of the BULLETIN within the proper limits, and at the same time to make it of interest.

The Constitution and By-laws were not reprinted in 1918, and thus the list of members appeared in separate form. As only the latter changes regularly from year to year, this might be a good precedent to adopt.

EDWARD B. STURGIS,  
*Assistant Secretary.*

December 31, 1918.

After proper record had been made that the report of the Assistant Secretary was accepted by the meeting, Professor Peele stated that he had been much impressed by the extra work which the war had imposed upon the officers of the Society, as evidenced by their reports, and that, in recognition of this fact, he desired to move:

That there be placed upon the minutes of the Society a vote of thanks to the officers for the large amount of work so efficiently done by them in connection with the Society's war activities. (*Motion carried.*)

The President then announced that next in order of business was the matter of considering certain amendments to the by-laws of the Society. He explained that about two years ago the Council, finding the by-laws inadequate in many respects, instructed the Executive Committee to prepare amendments to correct defects; such amendments were drafted, endorsed by the Council and presented for consideration at the annual meeting of the Society, in 1918. This meeting having accepted the proposed amendments, and copies of them having been sent to the entire membership, they were referred to a second meeting of the Society, in accordance with the by-laws.

It was then explained by the President that, when the time for the second meeting arrived, circumstances arose which made it desirable for the Council to withdraw the amendments from further immediate action. One of the reasons for this procedure was the fact that the Council had other amendments in mind which would prove useful. Therefore, the President further stated, the amendments which were now to be offered comprised in the main those submitted last year, but with some additional matter, and that, in this form, they had received the endorsement of the Council.

The suggestion was made by the President that a motion would be in order to consider these amendments one by one, and that they then could be accepted as a whole; and that furthermore this would give an opportunity for detailed explanation wherever needed. Such a motion was made and passed.

The amendments to the by-laws as accepted by the meeting, together with explanatory statements, follow:

#### AMENDMENTS TO THE BY-LAWS.

1. Amendments approved by the Council on December 10, 1917, then published in the BULLETIN for December, 1917, and finally presented at the annual meeting of the Society on January 8, 1918; later withdrawn from further immediate action.

2. The same amendments, with some slight changes, reaffirmed by the Council on January 2, 1919. Also, additional amendments approved by the Council on the same date.

(New matter italicized; omissions bracketed.)

#### ARTICLE 1.

The wording "secret letter ballot" to read "*sealed letter ballot.*"

The following sentence to be added at the end of this article:

*Any person, not a member of the Society, to whom the gold medal of the Society has been awarded, may become a member of the Society upon his own application.*

#### ARTICLE 6.

This article to read:

"The membership of any person in the Society may be suspended or terminated for reasons of weight by a four-fifths vote of the council. Notice of such intended action shall be sent to such member by registered mail, and action shall not be taken for at least thirty days after the receipt of this notice by such member. A member suspended or expelled may demand a sealed letter ballot sustaining the action of the council. This ballot shall be sent to all members entitled to vote and may be accompanied by a statement signed by the council or a committee thereof, and by a statement on behalf of the accused [of not more than one thousand words, or not exceeding in length that prepared by or for the council]. A majority of the votes received *within thirty days after the mailing of the ballot* shall be required to reverse the action of the council."

According to By-law No. 6 as it now reads, the "accused" is limited in his statement to one thousand words. The proposed amendment removes that limitation.

#### ARTICLE 8.

This article to read:

"The officers of the Society, as provided in the constitution, shall be elected as hereinafter provided, except that whenever a vacancy occurs it shall be filled by a majority vote of the council. Their respective terms of office shall begin at the close of the meeting at which they are elected. The duties of the several officers shall be such as usually attach to the office, or such as may be determined by the council. [The council may delegate

its powers to persons or committees, and may make such rules and regulations as may be necessary for the proper conduct of the business of the Society, provided that these are in harmony with the constitution and by-laws.]” *In the event of the disability of the president, either by sickness or absence from the United States, or otherwise, to perform the duties of his office, the vice-president shall act. If both the president and vice-president be incapacitated, a meeting of the council at the earliest possible date shall be called by the secretary and a second vice-president shall then be elected to act in place of the president and first vice-president. In the event of the absence or disability of the secretary, the president may appoint an assistant secretary to act in his place, subject to the confirmation of the council at its next following meeting.*

## ARTICLE 9.

The following new article to be added:

*The council shall make such rules and regulations as may be necessary for the proper conduct of the business of the Society, provided that these are in harmony with the constitution and by-laws. The council shall administer the business of the Society and may delegate its powers, except such as are expressly reserved by the constitution and by-laws, to persons or committees. The council may not express opinion for the Society on any public question, but after the membership has expressed an opinion as an act of the Society, the council and executive officers may commit the Society in accordance with the terms of such act and it shall be their duty to promote the purpose of such act.*

## ARTICLE 10.

The following new article to be added:

*The council of the Society shall elect annually from its members an executive committee of five, of whom the president, vice-president and secretary shall be members ex-officio, the two other members to be elected as soon as possible after the annual meeting of the Society. The executive committee, besides performing such duties as may be instructed by the council, shall also act as the membership committee as provided in By-law No. 1.*

*There shall be a committee on award of the annual medal, consisting of three members of the Society, appointed annually by the president, but councillors shall not be eligible for this committee.*

*The council may create other committees, standing or temporary, to which appointments may be made from the membership at large. Temporary committees may be discharged, and standing committees may be abolished by action of the council.*

Old Article 9 to become ARTICLE 11.

Old Article 10 to become ARTICLE 12.

This article to read:

*[Three months] Not more than 100 days and not less than 90 days before the annual meeting, the secretary shall send a nomination ballot to each member of the Society in the districts for which new councillors must be elected, with the request that he shall nominate three members, in such manner as the council may direct, as candidates for councillor to represent his district; and shall send a nomination ballot to each member of the Society entitled to vote, with the request that he shall nominate one member for president, one for vice-president and one for secretary. Nominations shall be received for 20 days, counted from the time of mailing the ballot, when the polls shall be closed and the ballots counted by the Secretary,*



*who shall report the result to the council. [Sixty days before the annual meeting the Secretary shall issue a ballot, containing in and for each of these districts not less than three names, and for the offices of president, vice-president and secretary, each, not less than three names, which shall be in each case those receiving the largest number of nominating votes. Provided, however, that the ballot may comprise less than three names for any office if less than three persons have been nominated for that office; and, moreover, that persons receiving less than seven votes for an executive office and less than three votes for councillor may be disregarded, and provided further, that no person may stand for more than one office, and when votes are cast for the same person for more than one office he shall be placed on the ballot only for that office for which he has the largest number of votes.] Sixty days before the annual meeting the Secretary, with the advice and approval of the council, shall issue a ballot containing in and for each of these districts not less than two names, which shall be in each case those receiving the largest number of nominating votes; provided, however, that persons receiving less than eleven votes for an executive office and less than seven votes for councillor, may be disregarded, and provided further that no person may stand for more than one office, and when votes are cast for one person for more than one office he shall be placed on the ballot for the higher office. In the event that not more than one person receives the necessary number of qualifying votes, the council may make nominations. The ballot prepared as thus directed shall be mailed to each member of the Society entitled to vote, who may vote for one councillor in each district, having the right to substitute names not on the list, and to cast not over three votes for a single candidate, provided that the total number of votes cast by such member shall not exceed the total number of vacancies to be filled; and who may cast one vote for president, vice-president and secretary, respectively, having the right to substitute names not on the list. The ballot shall be signed, sealed and voted as prescribed in By-Law 15.*

The main purpose of this amendment to By-law No. 10 (now 12) is to overcome a practical difficulty, experienced yearly in the direct primaries, whereby votes are much scattered and many tie-votes result, especially in the nominations for the council. At the recent election, for instance, the ticket carried the names of 31 candidates for election to the council for Districts 1—2—3—4.

The other changes to this article are more or less technical, making it mandatory that the Secretary should submit the ticket of nominees to the council for approval, and giving him some leeway as to when the ballot should be issued.

Old Article 11 to become ARTICLE 13.

The title of this article is amended to read "Canvassing Ballots for Officers and Councillors", and text of article to be as follows:

*[At noon of the first day of the annual meeting the polls shall be closed and the ballots counted by two tellers appointed by the president.] At noon, two days (Sundays and holidays excluded) before noon of the first day of the annual meeting, the polls shall be closed and the ballots counted by two tellers appointed by the president. Councillors shall not be eligible for such appointment. The candidate for councillor in each district, and the candidate for the respective elective offices, receiving the largest number of votes, shall be elected. In case of a tie the president shall cast the deciding vote.*

The procedure provided by the present By-law No. 11 (now 13) is a physical impossibility; the ballots cannot be opened at noon and counted by two o'clock, the hour customarily fixed for the annual business meeting.

Old Article 12 to become ARTICLE 14.

Old Article 13 to become ARTICLE 15.

This article to read:

"The council shall provide for regular stated meetings of the Society, for the transaction of business, or for the reading or discussion of papers, to be held at such times and places as may best serve the interests of the Society. Special meetings of the Society, or of any section thereof, for a definite purpose, may be called by the president, or shall be called on a request in writing signed by twenty members. It shall not be in order at a special meeting to transact other business than that stated in the call for the meeting. *No action expressing the opinion of the membership of the Society upon any question of public or professional policy or interest, or endorsing or condemning any matter of public or professional policy or interest shall be taken at any general meeting of the Society unless 20 per cent. of the membership entitled to vote be present in person at the meeting. No action taken by a local section of the Society shall be reported otherwise than to the council, which upon receipt of such report shall act upon it, according to such rules as may be formulated by the council for this purpose, with the view to submitting it, if deemed proper, to the consideration of the Society as a whole.* Except for reasons of weight, at least thirty days' notice shall be given of all meetings, *other than meetings of sections.* [Except at annual meetings, ten members present in person or by proxy shall constitute a quorum. Resolutions endorsing or condemning matters of public or professional interest shall take such course as may be prescribed by the council in duly formulated rules, but such rules must provide that not less than thirty days be allowed for any ballot of the membership of the Society.]"

*Except as hereinbefore provided; resolutions endorsing or condemning matters of public or professional interest, or expressing the opinion of the Society, shall take such course as may be prescribed by the Council in duly formulated rules, but such rules must provide that not less than 30 days after date of mailing be allowed for any ballot of the membership. Upon the declaration of the result of any ballot by the president, it shall become an act of the Society and shall remain in effect until rescinded. It shall be the duty of the officers and council of the Society to make effective an act of the Society in every proper way.*

With respect to the amendment to By-law No. 13 (now 15), the President, W. R. Ingalls, explained that the changes in the main had been suggested at the meeting of the Council, on January 2, 1919, were quite important, and are offered by the Council only tentatively. The amendment is based on the desire to eliminate a certain vagueness in the present by-laws, to conform to precedents that have been created, and also to afford a little more leeway for action. The remainder of the President's statement is given verbatim:

"It has been the custom in the Society not to take any action on any subject involving expressions of opinion as to professional or public matters except after a referendum to the membership. It



has been the policy that no such action ever should be taken until there had been ample opportunity for discussion—plenty of time for deliberation and an opportunity on the part of every member to express his opinion—after which, if an action is taken with which he does not agree, a member can only say, 'I have been licked, but I have been licked only after the fullest kind of a chance; I haven't been licked by any snap action.' We are not sure whether the present by-laws provide for that, or not, but, anyhow, the policy which has been established, and which has been carried out, is not in conflict with that theory.

"There is some doubt, however, as to whether an annual meeting like this might not, under the constitution and by-laws, do anything it sees fit to do. We do not think that that is a good scheme. We do not think that an annual meeting, at which there may be 15 or 20 members present in person and 100 odd by proxy, which is according to the present by-laws, should have the right to commit the entire membership of the Society to some important political action, or professional action. There is, however, a great deal of doubt whether under the present by-laws a meeting like this might not do just that thing.

"Moreover, there have arisen occasions when general meetings have been called for some special purpose—not annual meetings, it is true—but general meetings at which there has been a distinct desire to take Society action. We had one such meeting on the 19th of April, 1917, immediately after the declaration of war by this country, at which the Society passed all kinds of resolutions. I was the President at the time, I was in the chair, and I raised no constitutional objections; I felt very sure that I would have been very unpopular if I had. But, I had it in mind that, if at any subsequent time the actions taken at that meeting were raised as precedents, I would say, and would rule, that we were not expressing opinions, we were making promises. At a special meeting of the Society last year, in considering the War Minerals Bill, it was proposed to take action committing the Society as a whole, although, notwithstanding it was an excellently attended meeting, it was only a small part of the Society that was present. The difficulty at that time was met by dissolving the meeting of the Society and calling a meeting of the New York Section which then might take action as the New York Section; such action might be referred to the Council and the procedure would be continued according to rule. This was done, with the eventual result of a referendum vote.

"Now, this that I have just made is a statement of the case. The amendment that is offered by the Council is designed with the idea of regularizing this business—the regularization of the principle



of the referendum vote. It is believed that members should not be deprived in a general meeting of the opportunity of doing something, and it is thought that, if a meeting of the Society, called on due notice, were attended by so large a proportion as 20 per cent. of the membership, that percentage would be a sufficiently large sample of the whole to permit action to be taken then and there. The Council is not necessarily enamoured with the proposal that it makes. It will in no way feel hurt if this amendment should be subjected to full discussion and something different proposed, but it is what the Council has thought to be a reasonable way of meeting this question."

Subsequently, in reply to a member's question, the President explained that, although it had been the practice of the officers to make effective any action taken by the Society, it had been thought well to embody that practice in language, and thus to make such procedure statutory.

Another member, in stating that it certainly ought to be possible for a general meeting of the Society to take action, remarked that the principal debatable point was the question of representation. While doubtful whether 20 per cent. was sufficiently large, he admitted that even an attendance of this size could hardly be expected. To this the President replied by reminding the meeting that, although the constitution and by-laws, as originally drafted, permitted a considerable use of the proxy vote, such representation had been found to be illegal, and that the whole tendency of the Council and members has been to eliminate proxy voting. He thought that this was the wise policy to adopt and that everybody was in agreement with it.

Old Article 14 to become ARTICLE 16.

This article to read:

"Local sections, or professional groups of members of the Society, may be organized for social, scientific and professional purposes, in harmony with the constitution and by-laws, and any such section shall have only such powers as are prescribed by these by-laws, and shall act under such rules and regulations as the council may from time to time approve."

Old Article 15 to become ARTICLE 17.

The title of this article "Sealed Letter Ballots" is changed to read "Letter Ballots." The new form of this article to be:

"When sealed letter ballots are required by the constitution or by-laws, the envelopes to contain the ballot shall be so designed that [it can] *one of them can and must* be signed on the outside by the voter for identification, and can afterward be opened by the tellers so as to preserve the secrecy of the ballot. [The endorsement may take the form of a proxy, to be voted by the tellers appointed by the president, or by such other person, not a councillor, as the member may designate.] The ballots signed and sealed shall be mailed or delivered to the secretary, who shall be responsible for their safe-keeping, and who shall [endorse thereon the date and time of receipt and] make record of such receipt on a list of members kept for the

purpose. Any member shall have the privilege, at any time before the closing of the polls, of substituting another ballot, in which case the original shall be returned to him unopened. After the closing of the polls, the ballots, arranged in alphabetical order, with the check list of members above mentioned, shall be delivered by the secretary to tellers appointed by the president. The tellers shall verify the check list, and open [and mix thoroughly the votes] *the ballots only* in such manner as to preserve the secrecy of [the ballot] *them*. The ballots after being counted by the tellers, shall be destroyed *upon order of the president*, and the report of the tellers shall be the official record of the vote. In case a supplementary ballot shall be ordered for members failing to vote on the first ballot, the members whose votes have been counted shall not be permitted to vote a second time nor to change their original vote. The result of the ballot shall be communicated to the members of the Society [at such time and in such manner as the council shall determine] *immediately by the president, who shall declare the vote."*

#### ARTICLE 18.

The following new article to be added:

*Letter ballots of the council, which need not be sealed, may be conducted either by mail or telegraph as instructed by the president. In the cases of letter ballots for election of members, award of annual medal and on questions of discipline of members the vote may be canvassed as soon as the entire fifteen members of the council have responded, but in the absence of response from all of the members, the polls shall remain open for 30 days from the time of issuance of the ballot, at the end of which time the votes received shall be counted and the result reported. In all other cases the ballot may be reported and the motion be declared carried or defeated as soon as the requisite number of votes have been received. Except where expressly provided to the contrary by the by-laws, a majority vote of the council shall be sufficient to pass the motion put to ballot. Council ballots shall be opened and tallied by the secretary, who shall hand them to the president, who shall declare the result and cause it to be entered in the minutes of the council meeting next following.*

#### Old Article 16 to become ARTICLE 19.

"The council, by a two-fifths vote of its members, or upon request in writing of twenty per cent. of the members of the society, shall submit any question to the membership for a vote of confidence. Such vote must be inaugurated within fifteen days after a motion for a vote of confidence has been passed by the council, or a request in writing by 20 per cent. of the members of the Society has been received by the Secretary; and the majority of votes received within thirty days after [issuance] mailing of the ballot shall decide. In case such question is decided against the council, the members thereof shall forthwith resign office, their resignations to take effect on the election of their successors, and a new election of the whole council shall be immediately ordered to be conducted as provided in the by-laws. The new councillors shall by lot divide themselves into three classes to serve until the next annual meeting and for one and two years thereafter respectively."

The purpose of this amendment is to make certain that a vote of confidence initiated from outside is duly inaugurated by the Council.

#### Old Article 17 to become ARTICLE 20.

This article to read:

[Amendments to the by-laws shall take the course provided for amendments to the constitution, save that when the letter ballot is taken a majority

of the votes received within thirty days shall pass or defeat such amendments.]

*Amendments to the by-laws may be proposed at any meeting of the Society, or at any meeting of its sections, or at any meeting of the council. If approved by the council, the proposed amendments shall be submitted to the membership for letter ballot and a majority of the votes received within thirty days shall pass or defeat the amendment, the result of the ballot to be effective immediately upon its declaration by the president.*

This amendment to By-law No. 17 (now 20) is proposed to make it a little easier to amend the by-laws. At present, it is almost as difficult to amend the by-laws of the Society as it is to amend the constitution.

The President, W. R. Ingalls, thereupon announced that the meeting was open for the introduction of any new business. For the benefit of those present, and who would be unable to attend the evening session, he reported that the Council had voted to award the Gold Medal of the Society to Charles Eugène Schneider, for "Distinguished Service in the Metallurgy of Iron and Steel."

On motion at 4:30 p. m., a recess was taken until 8:00 p. m.

LOUIS D. HUNTOON,  
Secretary.

### **EVENING SESSION.**

Somewhat more promptly than is usually the case, members and their guests assembled in the banquet-room of the Engineers' Club for the annual dinner of the Society, scheduled for 6:30 p. m. The gathering was especially representative and was a third larger than that for the same function in 1918. The list of those attending follows:

|                   |                       |                      |
|-------------------|-----------------------|----------------------|
| A. W. Allen       | J. E. Johnson, Jr.    | Allen H. Rogers      |
| F. C. Alsdorf     | James Ellwood Jones   | Edwin M. Rogers      |
| S. H. Ball        | C. F. Kelly           | F. F. Sharpless      |
| G. P. Bartholomew | J. F. Kemp            | J. A. Singmaster     |
| Harlan H. Bradt   | H. H. Knox            | George C. Stone      |
| C. C. Burger      | Henry C. Krumb        | Edward B. Sturgis    |
| H. M. Chance      | Wm. Francis Lamareaux | George W. Tower, Jr. |
| D. E. Charlton    | Major W. H. Landers   | G. D. Van Arsdale    |
| Bernard T. Colley | J. Volney Lewis       | J. A. Van Mater      |
| J. V. N. Dorr     | W. Lindgren           | Andrew Walz          |
| Archibald Douglas | A. C. Ludlum          | A. P. Watt           |
| H. S. Drinker     | D. A. Lyon            | Walter Harvey Weed   |
| A. E. Drucker     | D. S. McAfee          | F. R. Weekes         |
| L. C. Graton      | C. Seymour Newcomb    | Wm. Young Westervelt |
| C. A. Howard      | Junius Parker         | Lowe Whiting         |
| H. H. Hubbell     | J. H. Polhemus        | Pope Yeatman         |
| Louis D. Huntoon  | Wm. N. P. Reed        | George J. Young      |
| W. R. Ingalls     |                       |                      |

A little after 8:00 p. m., with the advent of coffee and cigars, the President, W. R. Ingalls, opened the evening session by calling



on the Secretary to announce the result of the annual election for officers and councillors, for the benefit of those members who were not present at the business session earlier in the day.

(As the tellers report of the election appears on a previous page, the names of the successful candidates are not reprinted.)

The President then announced that the gold medal for 1919 had been awarded to Charles Eugène Schneider, of France, for "Distinguished Service in the Metallurgy of Iron and Steel." (Applause.) He thereupon requested the Assistant Secretary to read the biographical sketch of Mr. Schneider prepared by the Gold Medal Committee.

(Charles) Eugène Schneider, head of the Creuzot Works, at Le Creuzot, France, for his distinguished work in metallurgy of iron and steel, and especially for his development of the 75 mm. gun, to which a very large part of the success of the French and of our own men in France during the present war is attributed.

Born in 1868, Eugène Schneider undertook the management of the Schneider establishments in 1898, after the death of his father, Henri Schneider.

Under his enlightened management the Schneider establishments have been considerably extended, their activity being not only directed to increasing production, but also to spreading more and more their scope for action in all branches of industry—in metallurgy, mechanical and electrical construction, shipbuilding, artillery and ammunition, and in public works. During the ten years preceding the war, the number of employees in these establishments, and without counting those of the more and more numerous subsidiaries, increased by 50 per cent. approximately.

Whilst giving to peace industries all the attention necessitated by the progress in science and the continual improvement in industrial methods and products, Eugène Schneider, with a perspicacity that recent events have justified in a striking manner, especially directed his efforts towards the creation in France of a war industry able to counterbalance, when the time came, the enormous power which the German war industry had established. The task was all the more difficult in that the French government, supplied by its own arsenals, placed few orders with private concerns, and because the Krupp works had known how to establish a kind of monopoly throughout the world, helped to this end by the now familiar commercial methods and through the fact that a French law, only abrogated in 1882, prohibited the export to foreign countries of war materials.

Already in 1895, the Schneider establishments made special efforts to realize and improve heavy and light field ordnance, known as quick-firing, the appearance of which called forth a revolution in the armament and tactics of modern artillery.

After comparative trials, made in numerous countries between Krupp the Schneider materials, the latter were adopted (in spite of Krupp's influence and prestige), owing to their superiority, duly ascertained by military commissions. At the time of the breaking out of the European War, most nations which do not do their own manufacturing had replaced Krupp artillery materials by those of Schneider; successive failures in the materials of the German firm, reports of which had been spread broadcast, sanctioned the triumph of the French manufacturer, confirmed by the present war.

When the war began, the development reached by Mr. Schneider in the manufacture of war materials proved extremely helpful to the French gov-

ernment. In the Schneider works, not only units of various calibers were found to be completed, or in the course of manufacture, for foreign governments, but also shops ready to immediately undertake artillery and ammunition manufacture and a competent staff for these difficult tasks; a specially trained staff, to assist in starting numerous other shops which were not familiar with this kind of work.

The Schneider works and their many subsidiaries which, since mobilization, have been exclusively devoted to war work, in spite of labor difficulties, employ at the present time, about 150,000 workmen. The Creuzot plants, which are the oldest and most important of the Schneider works, employ in addition to local labor, reduced through mobilization, Arabian, Moroccan, Anamite, Chinese, Spanish workmen, etc. Women constitute now about one-third of the labor.

The war materials, delivered in very large quantities during the war to the French and Allied governments, are of the most varied types: Field guns and howitzers (heavy and light types), siege guns, large caliber guns on railway mounts, tanks, shells, cases, fuses, explosives, torpedoes, sights, submarine and airplane engines, armor plate, etc.

Not only in France, but in Russia, Italy, and England, Schneider et Cie.'s engineers have initiated numerous works for war manufacture especially in the preparation of special gun and shell steels. Also the American Government adopted for its ordnance, the 155 and 240 mm. howitzers and railway mounts for large caliber guns, the Schneider model. This ordnance brilliantly proved its superiority on European battle fields, and is at the present time being manufactured in U. S. Arsenals, with the technical help of specially trained agents from the Schneider works.

Besides the technical and industrial development of the works, Eugène Schneider has given his attention to social economics as begun by his ancestors for the welfare of their employes; all questions pertaining to the interest of workmen have been the subject of his constant attention and, very often, received solutions which were very much in anticipation of recent laws. These institutions of social economics can be summed up as follows: Schools, technical instruction, evolution of salaries, inducements to saving, old age pensions, allowances for the sick and the wounded, medical attention, hospitals, hygiene and safety conditions, mutual societies, etc.

Mr. Schneider was elected to the presidency of the Iron and Steel Institute (British) for the year 1918.

The formal business concluded, the President, in accordance with the by-laws, delivered the annual presidential address.

### THE ECONOMIC DUTIES OF THE ENGINEER.

Address by W. R. Ingalls

During the last six months we have heard much in this country on the subject of reconstruction, or readjustment. Great Britain and France had begun considering it a long time previously. With us, however, the armistice came so suddenly that we had hardly got into it. Being thus taken by surprise, there was for two or three weeks a good deal of panicky talk about it, but since then, although the subject is about the most important of those confronting a sorely tried world, the academic



interest in it has waned considerably. Apparently some people, who during the last two years have been drawing diagrams of organization and formulating plans on paper for the regulation of all human and industrial conduct—and, indeed, putting not a few of those plans into practice—had visions of restoring conditions to normal in a similarly official way. Their conception was not unlike what they might have had of a clock whose complicated mechanism had been altered to run in an abnormal way, which had to be taken apart once more and reconstructed according to its previous organism. But the interest of officialdom was distinctly moderate when the President in his address to Congress early in December revealed the absence of any Administration plan for reconstruction, and dismissed the matter with the suggestion that the people would probably work out their problems for themselves. Since then the mushroom bureaucracy has been most interested in dissolving and getting back to pristine occupations as rapidly as possible.

The President's remarks were, it seems to me, a mixture of wisdom and inattention. There was wisdom in the thought that the people would solve their industrial and commercial problems better than a bureaucracy could do it for them. There was inattention to the pressing need for readjustment in matters of direct business relations between the Government and the people, requiring prompt legislation to apply to conditions of canceled contracts, legitimate claims and the disposition of enormous accumulations of goods.

There were people, who, scoffing at the bureaucratic ideas about elaborate, theoretical plans for reorganizing things, believed all along just what the President expressed, although perhaps their thoughts were based differently and were of broader scope. They knew from their previous business experience that commerce and industry, overtaken by a sudden emergency, could not, and would not, wait for plans to be drawn; but would go ahead and do things in their own ways, and that their doings would be expressed in the commodity markets and in the relations with labor, both of which expressions would be practical, not theoretical. Let alone, the mere readjustment would be completed before any academic plans could be drawn. The situation was not unlike that of the old story of a railway bridge in Montana that had been destroyed by fire. The bridge engineer and his staff were ordered in haste to the place. Two days later along came the superintendent of the division. Alighting from his private car, he made haste to see the old master bridge builder.



"Bill," said the superintendent, "I want this job rushed. Every hour's delay is costing the company money. Have you got the engineer's plans for the new bridge?"

"I don't know," said Bill, "whether the engineer has the picture drawn yet or not, but the bridge is up and the trains is passin' over it."

Our own industrial bridge is going up pretty fast, though the trains are not yet passing over it, and no plans were drawn. Yet the President was wrong, I think, in pronouncing that readjustment was simply an affair that the people themselves ought to manage. There are relations between the people and the Government to which the latter, in justice, should give earnest attention, as indeed it is now doing, but only partially.

Many contracts into which producers entered upon telegraphic or verbal instructions, as they do in ordinary business affairs, have been repudiated by governmental bureaus on the ground that they had not been signed and sealed in the statutory way. In many cases these contracts, now repudiated, were accepted by producers at the urgent request of Government officers, and shipments to fill them had begun.

The Government has canceled contracts that were duly signed and sealed and in so doing has given the other contractual party good ground for claim for indemnification of loss. Under present conditions of adjudicating such matters many legitimate claimants who are now young men will be old, old men before they receive what is due them.

The Government accumulated immense stocks of material of many kinds, which will have to be liquidated. The method of this liquidation will have a great influence upon the markets and consequently upon industrial conditions.

Unless broad and generous arrangements to provide for these plainly required matters of readjustment, to which the Government is a direct party, are promptly made, the situation will be fraught with some serious and immediate industrial dangers.

But while the people are rapidly attending to the general matters of readjustment that are involved in changing from a war basis to a peace basis, and while the Government is neglecting some of the relatively simple matters that obviously pertain to it, there is a broader phase of the new economic conditions that as yet we have scarcely begun to consider. Indeed, there is danger that we may be heedless in an hour of peril.

We began some time ago to talk about reconstruction. Then

we made up our minds that readjustment was a more expressive word. I am not sure but that a word that is even more expressive of what we must consider is *reorganization*. That which has heretofore been uppermost in our minds, and perhaps is still, was the restoration of our old organisms, our old systems and methods of doing things. We may question whether so simple and so complacent a program is either all that is required, or even is safe. In the common happiness over the termination of the war, we run the danger of failure to appreciate the cataclysm that the world has experienced. I have listened to eminent financiers and industrialists prophesying an era of such prosperity as was never previously enjoyed by this country, and I have read many essays on the same subject that exuded optimism. Some have even dismissed the possibility, if not the probability, of troublesome conditions during the period of preliminary readjustment that many economists expected to follow immediately after the armistice, and that, indeed, is already upon us.

It is never popular to be pessimistic, but I suspect that many of those who have drawn the most optimistic pictures in public do not see things in quite so rosy a light in the privacy of their studies. A preliminary period of irregularity in business, accompanied by disturbances of more or less serious character, is inevitable. This will be the period when the pains experienced in changing from a war basis to a peace basis will be most acute. Following this there is reason to expect a longer period of illusory prosperity, during which the actual reconstruction in Europe is going on, during which the depleted warehouses for ordinary commercial goods are being filled up, and during which the deferred wants, both at home and abroad, for many articles are being filled. The housing and transportation facilities of this country are both, probably, behind the demands, and a great deal of material and labor will be required to furnish what the people need.

But, nevertheless, I cannot foresee a long-enduring period of prosperity, certainly not unless there be a good deal of reorganization in the industrial methods of every country.

The wealth of the world before the war was estimated roughly at about \$600,000,000,000. The cost of the war is not uncommonly mentioned as being about \$200,000,000,000, which is approximately the sum of the war debts of the several countries. Apparently, then, the wealth of the world has been diminished by about one-third; but a little reflection will show that this cannot be so. America, Great Britain, Germany, Austria, and the neutral countries have all of the houses, railways, fac-

tories, farms, and public improvements that they possessed previously, although some of this plant, especially in Germany and Austria, has deteriorated by wear that has not been made good. France, Belgium, Poland, and Serbia still have the most of their physical property, the actual destruction in France being estimated at about \$8,000,000,000 and in Belgium at about \$2,000,000,000. German authorities estimate the destruction in France and Belgium at about \$5,000,000,000. The destruction in Serbia and Poland is large, but is less than in France and Belgium. Russia had most of her property intact, though badly deteriorated until the Bolsheviki began to destroy it, since when the destruction there has been catastrophic. There is grave danger that the German bolshevists may do something similar in Germany. The world's loss of shipping is estimated at about \$3,000,000,000. Great as these losses will total, they will be far short of \$200,000,000,000, which figure includes the cost of the direct withdrawal of tens of millions of men from the production and accumulation of wealth; and the occupation of other tens of millions in supporting them. Such loss is of course the loss of what might have been created and saved rather than what was. Even the use of the metals and other materials in warfare, at the expense of the depletion of our mines and forests, has been largely the loss of what might have been, rather than what was. The war debts of the several countries are in the main internal affairs, representing redistribution of accounts among the several nationals. Thus, the fact that the German debt is nominally a large proportion of the wealth of Germany does not mean that the latter has been impaired to that extent, or that Germany cannot assume the payment of a huge indemnity to the countries that she maltreated.

Nevertheless, the real loss by the war through the destruction of property and the impairment of property, and by the destruction and crippling of men, women and children, is not to be minimized. Although the property loss may not amount to one-third of the world's total wealth, there is no doubt that its real amount can be represented only by a stupendous figure, and the same is to be said of the loss and impairment of population. It is estimated that the world's loss of life from causes due to the war, including the influenza, has been 26,000,000 souls during the last 4½ years. The number of those wounded, maimed, and shattered in health is greater than that. A world that has suffered such losses in material wealth, in life, and in the deterioration of the physical and mental powers of the populations of many of its countries, cannot confidently look forward, it is evident, to any era of great prosperity or even to a prosperity like



what might have been expected if the war had not been; not unless some new ways and means of a superlatively compensating character can be devised. Any other thought would be equivalent to the idea that it would be a good thing for business if all the windows in the United States should be broken, which is an economic fallacy that was long ago exposed, although it is still entertained among labor unions. I say it would be preposterous to build hopes of a coming era of prosperity if the world is simply going to readjust itself to old conditions. Even if it does more than that—even if it institutes economic improvements of the first order of magnitude—there is grave doubt whether it can do much more during the next generation than make good its losses during the five or six years of war and demobilization.

There are, however, plenty of signs that the world is entering upon the new era with new ideas. Some of these are very hopeful. Others are distinctly ominous. Among the hopeful factors are the new thoughts and habits of the people, which may be summarized as the broadening of the vision of national and international relations respecting industry and welfare, the better appreciation of the principles of economics, the inculcation of habits of thrift, and the better understanding of common interest and the advantage of cooperation. The manner in which the American people saved food and fuel, exemplified best of all by the prompt adoption of gasless Sundays, upon a mere request communicated through the newspapers, was one of the most exhilarating of events during the last year. Who will venture to prophesy that this spirit, now that it has been excited, is going to disappear?

On the other hand, there have been alarming exhibitions. Labor has been loyal during the war, but to a large extent it has been misguided. It has failed to take full advantage of its opportunities. Enabled by the natural law of supply and demand to obtain wages that in many cases were fantastic, it has neglected to exercise thrift, and, on the contrary, has squandered not only its earnings but also its time, and even has let its efficiency diminish. It is unnecessary to go into details of this indictment, which every employer of men knows to be true in the main. Never before in the history of modern civilization did labor have such an opportunity to elevate itself in the economic scale while what are called the capitalistic and bourgeois classes were being reduced by taxation that was caused to fall especially upon them; and never was there such a misunderstanding of the nature of wealth as labor exhibited. Even now is there a demand, not only in America but also in Europe, that although the war is ended the war scale of wages shall not be reduced. Analysis of

the fundamental conditions will be convincing, I think, that wages cannot be maintained at the recent level, that wages are not broadly a matter of arbitrary dictation to employers, and that when there is such dictation the result in the main is the profit of one group of labor at the expense of other groups of laboring men. The only way whereby real wages may be increased is quite a different one.

There prevails among workingmen, or among many of them, the idea that they are exploited by a class whom they call the capitalistic class, which is supposed to enjoy the major part of the fruits of industry, and that idea is cultivated by agitators and professional doctrinaires. Thus I read in a recent treatise entitled the "High Cost of Living" by Dr. Frederic C. Howe, that "in 1916 we (the United States) produced \$45,000,000,000 of wealth. That is \$450 a person, or \$2250 for every family in the country. It is a sum adequate to raise a family in comfort even at the present high cost of the necessities of life." . . . "The total wages paid in the United States in 1916," continued Dr. Howe, "amounted to but \$5,320,000,000, or 11% of the total wealth produced. . . . The explanation is to be found in monopoly, which has become all-pervasive." Therefore, according to Dr. Howe, the average wage per person was \$53.20 per annum, or \$266 per family. What could be more absurd? Consider that the 2,000,000 railway men averaged approximately \$1000 per annum, or a total of \$2,000,000,000, according to Mr. McAdoo's figures; that the employees of the United States Steel Corporation, about one-fourth of a million in number, averaged \$1050. We ourselves know well enough what the men average in the great mining and metallurgical industries.

Scott Nearing, one of the most blatant of our socialists, asserted recently that if incomes were equalized all over the United States there would be enough for every workingman in the country to have \$60 a week. Now let us see about that. Let us convert Professor Nearing's \$60 per week to \$3000 per year, disregarding the odd hundred. To give every worker \$3000 per year the total income would have to be \$120,000,000,000, whereas, in fact, it was only five-twelfths of that, according to the highest estimate for 1916, which was a very prosperous year.

The spread of such lunacies, which have been put into hideous practice by the Bolsheviks in Russia, constitutes one of the great economic dangers that confront the world. It is true that the workmen of Russia, who acted upon the theory of "steal what has been stolen," have learned to their sorrow that the only things worth stealing are the accumulated stores of food.



fuel and clothing, that they represent but a trifling part of the wealth of a country, and that when they have been consumed the rest is of no use without work; and that work is of insufficient productiveness unless intelligently directed. The facts that the experiments in uplifting the proletariat by stealing have failed in Mexico, and then in Russia, do not convince the socialistic doctrinaires. They will not learn until they have tried the same experiment everywhere. It is one of the great duties of intelligent people of all kinds, but especially of engineers, to eradicate this poison from the minds of the workmen, who exhibit its symptoms in various ways and in various degrees. The engineer is the natural enemy of Bolshevism, the natural enemy of all uneconomic thought.

In 1917 one Robert Bruere went to Arizona to report upon the social and industrial conditions at the time of the general strike among the copper miners. In one of Mr. Bruere's articles there was a subcaption "Copper Companies Regard Mining as a Matter of Engineering Rather Than of Democracy." Mr. Bruere reported an interview with a mine manager whose idea was that if mine managers played with democracy they would never get out the ore. "He did not consider mining to be either a problem of democracy or autocracy, but simply a problem in engineering," naively remarked Mr. Bruere, who added that the dream of this manager was a mine from which the ore might be extracted by automatic machinery, just as it is now crushed and concentrated by machinery.

Mr. Bruere was right in his discernment that we regard mining as a matter of engineering rather than of democracy. If we did not so regard it there would be mighty few mines of any kind in operation today, and the world would be wondering about its metal supply. There are big ore deposits today whose output will be needed, that we cannot yet manage to work, but hope that we can if we succeed in getting more mechanized. If anybody has any notion about running mines by democracy, he may usefully examine what the workingmen did with the Spassky, Kyshtim, Ridder, and other great mines of Siberia. We know that Mr. Bruere was wrong in his fantastic notion that "democracy implies intelligence, initiative; and these are precisely the most undesirable qualities in a mucker." On the contrary, he might have learned, if he had taken the trouble to do so, that the great effort of enlightened managements everywhere is to increase the intelligence and initiative of the men and enable them to draw more pay for the simple reason that they earn it.



What engineer is there who does not know that the essential assumption of pure democracy as applied to industry—that production should be controlled by the people themselves—is in direct antithesis to the fact that in modern industrial life efficiency of production has increased as the efforts of the many have been directed and organized by the talents of the few. Must not every engineer of experience in leadership agree with Mallock, the great philosopher, that the oligarchic principle is as dominant in industry as it is in political democracy?

But superior to all the industrial and political principles are economic laws, for it is those laws, which are laws of nature, that create and determine principles and practices. One of the greatest of economic laws is that of the survival of the fittest, which exhibits itself in competition, and from that is derived the classic economic doctrine that labor is the residual claimant upon the produce of industry. After the shares of the state, the landlord, the capitalist, and the entrepreneur have been deducted, all the rest goes to labor, and here is what is mystifying to many, to wit, rent, interest, and profits are limited by competition, and of them the laborer can get neither the share of the landlord nor of the entrepreneur by any economic means, while, as for interest, the residual claimant is benefited by every payment on account of capital used in the production of wealth, and is better off when a high rate of interest is being paid than when a low rate is paid. We may apply the principles to the concrete case of the United States.

The wealth of the United States at the end of 1916 was estimated at about \$250,000,000,000. The production of things was about \$50,000,000,000. These are very rough figures, as they are bound to be. Estimates relating to this subject vary considerably. I have mentioned the highest that I have seen. There is reason to suppose that the higher figures are more nearly correct than the lower. Anyhow, I am going to use the highest only to give an approximate idea of proportions. This was before the United States entered the war, and, according to the United States Bureau of Labor, we had 40,000,000 workers. Let us assume that rent, interest, and profits averaged 4% of the wealth of the nation, which would hardly be extravagant. That would account for \$10,000,000,000 out of the total produce, leaving \$40,000,000,000 for labor, or \$1000 per worker. We have already seen that 2,000,000 railway workers and 250,000 iron and steel workmen received about that sum. Those figures are specific expressions of two whole industries. The workmen in some other industries earned more; in some they earned less. However, there is considerable evidence that the general average was about

that figure, or something near it, and, anyhow, whatever error in statement there may be will not invalidate my following argument.

That labor does not get increased wages at the expense of capital (unless capital be confiscated, in which event the increased wages will not long endure) is illustrated by the experience with the railways in Great Britain and America. The governments guaranteed the bond and stock holders their average return for a series of pre-war years. In the United States this was \$1,000,000,000 per annum, or just about 5% on the capital as reported by the Interstate Commerce Commission. The increase of \$800,000,000 in wages has been paid by the public in higher freight and passenger rates. To have left the roads in private hands, compelling them to pay higher wages without permission to make higher charges, would have resulted, first, in impaired service and finally in the state having to take over the lines and supply the deficit in order to have any service at all, just as happened with some of the street railway lines in Massachusetts. Thus, what is virtual confiscation aids the wage earner only slightly and only temporarily.

But apart from confiscation, the winning of increased wages by one group of labor is obtained only at the expense of other groups. The inequality in the distribution of wealth is not between the capitalist and the laborer, but rather is it among laborers themselves. There is ample ground for the surmise that the professional, clerical, shop-tending, and similar classes, and the salaried classes generally, have suffered especially at the hands of the railway operators, mechanics, artisans, builders, and miners, but the farmers and the factory folk have not been immune.

I am not going to enter upon any fine analysis of the very rough statistical data that I have given, and shall point out merely that after the state, the landlord, the capitalist and the entrepreneur have got their taxes, rent, interest and profits, of which the last three are severely limited by competition, labor gets all the rest and what it gets is what it produces. The only way it can get more is to produce more.

It is unfortunate that the only way of expressing production is in terms of money. If it were possible to express it in terms of goods, there would be less misunderstanding. However, it is clear that if the total goods and the total population remained the same, it would not matter if the money value of the goods fell from \$50,000,000,000 to \$30,000,000,000, i.e. it would not matter at all if money wages fell from \$1000 per annum to \$600.

as, indeed, they would fall inevitably. On the other hand, if commodity prices remained the same, and the value of products should rise from \$30,000,000,000 to \$50,000,000,000, labor would get so much more, for it would be producing more goods. This is the only way that the war scale of wages can be maintained, and it is a problem of capital, labor, and talent to co-operate in accomplishing it, for only by co-operation can it be done.

This is no preaching of capitalism as commonly understood, but is simply classic and proved economic doctrine. The workman who wastes time and material, the farmer who lets himself be led astray by foolish agrarian policies, the small miner who is similarly misled, the manufacturer and the railway company which fail to adopt efficient methods, the interests large and small which create monopolies or enter into agreements to exact non-competitive prices—all of these are counter-agents to progress in human welfare, although in varying degrees. Probably, on the whole, there is more intelligence among the great corporations than there is among the labor unions, and a better understanding of economic principles, but there are some labor unions whose leadership is bright and some corporations whose management is stupid, while of both there are many that are only mediocre. My thesis is rather that the only way whereby the condition of the mass of the people can be improved is for it to produce more, and the loss of capital and life that has been suffered during the last 4½ years make it particularly essential now to give attention to increased production, to accomplish which we shall undoubtedly need to develop new systems and new methods. This is what I mean by the necessity for reorganization, rather than readjustment, after the war. And it is in such reorganization that the engineer must play a great part. England is already making her plans, and unless we are careful she will get the start of us. Thus, I recently noted the following paragraph in a letter from an observant American traveling abroad:

“England is knitting together for work. The directors of capital and the organizers of labor were never more together. There have been no strikes in England against capital, only against government wages or failure of government to equalize matters as between war bonuses and high cost of living. England is studying efficiency and is preparing for the overseas competition of the future. Forty-six English factories, without trade union or labor opposition, have adopted scientific management, but no stop-watch can be used in any factory controlled by the United States Government, nor is it allowed by the labor



unions to make studies in time or motion, or to compile records to promote individual efficiency."

Now, more than ever, should labor in this country be taught that its real interest is to produce more, which is to earn more, and employers should not attempt to diminish labor's residual claim by abolishing competition among themselves or artificially enhancing profits by other means. And just as it is the interest of labor to earn the maximum, so is it the duty of the employer, which means that he should ever be alert to improve his methods of production. Wide differences of plant efficiency, administration, etc., are really the inspiration of social unrest among workers, rather than conditions that are intentionally designed to be evil. The social reformer, who does not understand production, is a far less important person in the promotion of human welfare than the engineer, who does.

My rather discursive presentation of some fundamental economic conditions, and some approaching problems resulting from them, has been to furnish a background for my thesis of the economic duties of the engineer. America and Great Britain may be in no danger of either political or industrial socialism—the results of the recent elections in each country are reassuring as to that—but, nevertheless, some of the virus has got into us, and, anyhow, our affairs are bound to be affected by the backwash from the revolutions in Russia and in Germany. Those adversities come on top of the direct destruction by the war in the countries that have preserved their stability. You may mark my words that the engineer is going to have from now on such obligations as he never had before. How he will live up to them remains to be seen. Certainly he will live up to them best if he knows what they be. I can do no more than state them as I see them. Perhaps I see only a few of them. Without any doubt I fail to see all of them.

First of all what I see is that the engineer should saturate himself with sound economic doctrine. This is just as much the basis of his professional work as are the sciences of physics and chemistry; and the fundamental laws of economics are just as immutable as are the laws of gravitation and indestructibility of matter. The engineer-economist cannot possibly be a socialist, or a semi-socialist, nor even an industrial democrat; for it is his business to produce, and socialistic tenets do not tend toward production.

The engineer must be not only a counter-agent against the destructiveness of the proletariat, but also must he direct himself against the sluggishness of tortoise-like capitalists. One of

the cardinal principles of American engineering during the last 20 years has been the exchange of information and the promotion of publicity about everything—technical processes, business relations, corporate affairs. We have seen America forge ahead largely owing to the absorption of this idea, while Great Britain lagged behind and almost went asleep at the switch. She is wide awake now. Let nobody forget it. But we ourselves have got to go further in publicity than we have gone heretofore. Publicity has been a favorite word among us, especially among mining engineers, who have created more openness in the affairs of their profession and their corporations than exists anywhere else. In reading one of Hobson's treatises not long ago I found a word that struck me more emphatically than publicity. He spoke about transparency, and said that "Perfect transparency of industrial operations, perfect fluidity of labor and of wealth, would effect incalculably great economies in the production of commercial wealth." And he said further: "No fact bearing on prices, wages, profits, methods of production, etc., merely concerns a single firm or a single body of workers." The more you think about that the more will you be impressed by its truth and its merit. Further effort toward perfecting the transparency of industry is, then, another of the economic duties of the engineer for the promotion of the production of wealth.

I have just quoted from Hobson's work on the "Evolution of Modern Capitalism." In an addendum to that book, written in August, 1916, he outlined post-war economic problems in a way that was prophetic. Let me quote one paragraph: "After the war, the task of economic reconstruction will compel the adoption of bolder experiments, both in public and private enterprise, than had hitherto been thought possible. To realize the enlarged productivity, more pacific coöperation between capital and labor, employer and employed, is a first essential. The immediate peril of an economic situation in which labor seems liable to a sudden fall of wage from the artificially inflated war level will evoke conscious efforts to find ways of harmonizing the interests of capital and labor. The issue is one of devising adequate and reliable stimuli to draw from the workers a larger and more regular output of productive energy, a greater willingness to adopt and apply new mechanical and business methods, and, in general, to coöperate more effectively with the other factors of production."

There was real vision in that forecast of 30 months ago. I may be captious in my criticism of it for its reference to capital and labor, which antithetical representation of two parties alone



is always irritating to me. Even some of the socialistic writers recognized many years ago that it was necessary to consider the talented classes as well as the laboring and capitalistic; and recently Lenine and Trotzky, appreciating that the confiscation of capitalistic wealth would not reduce Russia to a dead level of equality so long as they allowed talent to exist logically began the massacre of the intelligencia. Labor, capital, and talent are a trinity, which one of our rough-and-ready philosophers not long ago represented as a three-legged stool. Among the talented, who are so eminent as the engineers, and whose is more clearly the duty of devising the new stimuli that must be provided?

But while devising stimuli for the workmen let us not forget the need for opening the eyes of the employer to his own defects, and I do not mean defects in his human relations, but rather his economic defects. For an employer may be a generous and lovable captain, whom those working for him may affectionately call "the old man," and yet he may be their worst enemy, an economic impediment, owing to his ignorance and backwardness. Just as there is a class of no-rent lands which determine the price of agricultural produce, so is there a class of no-profit employers who determine the rate of wages. I have previously in this address adverted to this subject, and indicated that the leaders of the workingmen should direct their energies against the inept employer who is their real enemy, rather than against the great profit-making entrepreneur who is their best friend.

Sometimes we see the backward manufacturer stirred to new and better things by the threat of imminent extinction through the advent of a new competitive process. Thus, about 20 years ago the contact process of making sulphuric acid promised to displace the classic chamber process, and abolish millions of dollars invested in plant, but the chamber-process men bestirred themselves, improved their practice, and held their own. Right now we see in the electrolytic process of zinc extraction a dire threat against the distillers, and the probable dislodgment of some of them. There will not be an extinction of them as a class, but there will be a case of the survival of the fittest; and those will be the fittest who first improve their practices in ways for which there is room, but which they will not take until necessity drives, necessity in this case being the danger of losing all of their capital tied up in plant.

We have seen how in ante-bellum days Great Britain practically lost important metallurgical industries, such as zinc smelting and copper smelting, in which she was once preëminent, and



we see her now keenly studying and introducing improvements that will rejuvenate her and not unlikely put her ahead of us if we do not look out. Similarly in France, Spain, and other countries, where important steps are already being taken. But few people here appreciate the alertness and intelligence with which the Europeans are entering upon a new program, for the simple reason that they know they have got to do it. It is one of the immediate economic duties of American engineers to see that our own industries do not become blind to the reorganization that is being started elsewhere and ought also to be considered here. I am not now thinking in terms of individual enterprises, many of which may be, and doubtless are, very efficient; but rather am I thinking of industries as a whole.

And just as we must think of industries as a whole, so also must engineers think and act as a whole. The individual, no matter how superior he may be, cannot alone make very much of an impression. Indeed, his influence may be greater abroad than at home, and may be more to the advantage of foreign people than his own if he be unsupported by a body of colleagues at home, as witness the influence of Orville and Wilbur Wright in aeronautics.

I think it is an indictment of the engineering societies of this country that they have made no general efforts for the advancement of economic conditions. Their meetings have been pleasant social functions, the benefit of which is not to be decried. Their printed transactions have been the repositories of valuable technical papers, which are useful for reference and guidance. But in their practical indications, in their practical push toward better things, they have been insignificant in comparison with the splendid efforts of the American engineering press, respecting which we may proudly say *ne plus ultra*. Pray forgive any impropriety in my expressing this, for of course I have not in mind my own trifling part in what hundreds of papers have done with the coöperation of industries and professions that they represent.

The Mining and Metallurgical Society of America is one of the few professional organizations that has aimed to improve economic conditions by active concerted pressure representing the consensus of professional opinion. Its efforts have naturally been confined to its own industry. In spite of its small membership, which smallness is, after all, inconsequential, so long as there is the right quality of membership, this society undeniably did most in recent years to improve the transparency of the mining industry. With equal assurance may it claim the credit of giving the impetus to the movement for greater safety for min-

ers. And also may it claim the crystallizing of the movement for a reform of our archaic mining laws upon new lines, as to which the mining industry is in almost unanimous agreement, the actual drafting of the new legislation having been delayed by the advent of the war. It is exactly such kind of work, now with regard to some broad economic principle, now with regard to some plans for new legislation, and at other times, at the present time, with regard to purely technical questions such as the status and particular problems of the copper, lead, zinc, or iron mining industries, that mining and metallurgical engineers must act unitedly through a body like this, if we are going to achieve the right reorganization in this country. And what we do in our particular field, so must the civil, mechanical, and electrical engineers do in theirs.

With the entry of the United States into the war, the engineers of the country, like everybody else, enthusiastically offered their services to the Government. I think that the engineers were particularly eager, for they knew from the previous experience of our Allies that it was an engineering war. Our own members, and those of other societies, and engineers generally, entered the services and undertook duties at Washington and elsewhere in great numbers. Now, far be it from my thought to minimize their accomplishments. The job was done, the war was won, sooner than we expected and more victoriously than anybody ventured to prophesy; and that was the principal thing. We performed some marvelous engineering feats in building cantonments, in repairing the German ships, in organizing and equipping a great Army and transporting it to France, in building shipyards and ships, in feeding our Allies and supplying them with materials. I cannot hope to enumerate all the praiseworthy things that we did, largely through the instrumentality of our engineers. Yet I cannot overlook that according to General Pershing's official report, made after the armistice, his armies had fought with French guns, British tanks, and French and British aeroplanes, although 19 months had elapsed since the United States entered the war. Nor can I forget the coal famine, and other industrial troubles in this country, and consider that the engineers of the country did all that they might. It was not their fault that they did not. They wanted to do everything in the best way, anyhow to give the best that was in themselves. The engineering societies did loyal and effective work in so far as they were asked or permitted. Yet it seems to me that the delay in starting shipbuilding, the subsequent aeroplane fiasco, the mess about making the 75-millimeter guns, and some mix-ups in our own industry show that our engineering bodies did not

exercise the pressure toward prompt and successful accomplishment that they might have done. Sometimes, when we knew that things were going wrong, we let ourselves be swayed by emotions and by condonations that anyone of us would have regarded as short of his duty to an individual client.

The wicked war is now ended, thank God, and the hurly-burly of doing things quickly, without counting cost, is past. We are entering upon an era not merely of reconstruction or re-adjustment, but of reorganization in which it will be many years before we shall be able to form much of an idea of what the result is going to be. There is every probability that engineers are going to be called upon to play a great part in this, and now, fortunately, they will be able to give more deliberate consideration to the study of problems and the formulation of plans than they could during the war. They will have to work individually and also concertedly through professional bodies like this. If they fail to do so, they will be derelict not only in their economic duty, but also in their duty as citizens of the Great Republic, whose welfare must not be permitted to suffer during the coming period of competition and elevation among our friends and rivals. (Applause.)

At the conclusion of his address, Mr. Ingalls introduced H. H. Knox, president-elect, who spoke as follows:

#### ADDRESS BY H. H. KNOX, PRESIDENT-ELECT.

The Presidential address presents to us a field of endeavor of such breadth of scope and depth of significance that to cover it in its entirety may be beyond our powers but in certain fundamentals we should and must make our influence as an organization count. Of the task of industrial reorganization, as Mr. Ingalls has pointed out, the Government washes its hands, but in this Mr. Gompers appears to be not quite in accord. He proposes a plan beautiful in its simplicity if in nothing else. Our troops are to remain in Europe rather indefinitely at public expense in order to reduce competition in the labor market at home. This shifting of the burden to the patient back of the taxpayer is of small moment but it remains to be seen whether the expatriated soldier will bear it with equal submissiveness.

Directly on the passing of the first shock of war, that is early in 1915, all the great belligerents established commissions to work out the problems involved in the transition of the industries from war to peace, consequently in Europe we may expect to see the passage from one state to the other accomplished with such ease and order as human foresight can effect. In our own



country we are meeting peace conditions with little more preparedness than that with which we faced war. It is for the industries to help themselves as best they may and if the technical societies can contribute ever so little toward the insight, order and sanity necessary to the transition they will thereby be exercising their highest function. I hold that the engineer's primary duty is to secure the greatest possible return on capital. He knows that this cannot be accomplished at the expense of labor but only by sharing with labor. It is the labor leaders' primary duty to secure the greatest possible return on labor and he will best serve his cause when he comes to understand that this cannot be accomplished at the expense of capital. We shall approach this question far more effectively if we can divest the popular mind of the prevailing confusion between the capitalist and capital and between the laborer and the work he performs. This will result in thinking less in terms of dividends and wage rates and more in terms of the scale of living which may be the reward for service rendered.

The last words uttered for publication\* by that great voice now stilled forever include these passages:

"The great war has put us in a new world. In this new world we must resolutely cling to the old things that were good, but we must also fearlessly adopt the new expedients imperative to bring justice under the new conditions."

And again:

"We ought to set our face against any restriction of production or any requirement that the good and skilful workman be kept down to the level of the incompetent or the lazy. But we ought also to insist, and wherever necessary to guarantee by government action, that an equitable share of the increased work done by the skilful man go to that man himself." Herein lies the nucleus of the problem.

Mr. Ingalls proposes to the Society a great task and this leads to some examination into the nature of the instrument which we have at hand for the performance of that task. A diagram of the machine sometimes helps towards its most effective use.

A decade or so ago the term self-expression was invented to define a yearning as old as humanity but which at that time was rising into the field of consciousness. Men were beginning to enquire whether each in his own sphere was individually and collectively asserting his own personality to the full extent of its value. It was a period of heart searching, of discontent and

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\*Metropolitan Magazine, February, 1919.

therefore of striving for better things, and it was in accord with this inward stirring that a group of engineers were moved to question seriously the adequacy of the existing means for the full self-expression of their profession. It was recognized that the established technical societies were successfully discharging their function of collecting, discussing and distributing contributions to the technical arts but here they stopped as here they must stop under pain of loss in effectiveness through diffusion of purpose. But the practice of an art is but a part of a profession and falls as far short of completeness as the mortal body fails to represent the man. Detached from spirit neither is a living thing.

It was, then, as I apprehend it, with the object of completing the professional function that the Mining and Metallurgical Society was conceived and the element of tumult, protest and rebellion attending its birth were but the outward manifestations of the quiet purpose within.

Our profession is peculiarly unfortunate in lacking a comprehensive name. Half a century ago the mining engineer covered the field. To-day he is but a specialist, one partner in a firm embracing many arts and sciences and therefore, if I may be pardoned for coining a word under the stress of necessity, I shall for the moment designate as mineralists all who devote their technical attainments to the service of the mineral industry, whether metallurgists or microscopists, whether miners or geochemists.

The mineral profession therefore has a dual nature of which that definite thing, our vocation, is the body and of which a certain imponderable is the soul. One might call the former the art and the latter the philosophy of the profession. Here the art is clearly concerned with the practical application of principles whereas the philosophy deals with the principles themselves.

Since, then, self-expression in the mineral arts has been duly provided for by the older technical associations and since our younger society, while distinctly disavowing any purpose of trespassing on their fields, has blazed a new trail for itself, not parallel to theirs but supplementary thereto, beginning where theirs left off, it may behoove us to pause a moment in our progress to take note of where we stand and whither our steps are trending.

Admitting the philosophy of the mineral industry to be our chosen field of endeavor, what is its scope? I conceive it to include chemistry but not leaching, molecular physics but not flotation, economics but not accounting; to embrace ethics, poli-

tics, sociology. It is receptive to all knowledge that bears upon the industry, absorbing it as some phosphorescent substances absorb heat to give it forth again as light, for energy received, however transformed, must again emanate if the law of conservation is to hold and if our purpose is to be fulfilled. And for the best efforts that we mineralists, individually and jointly, can put forth there is a crying need in the anxious time at hand and in the graver period perhaps to follow.

Whoever has studied the obelisk that marks the center of Paris may have observed with some interest that recent granite pedestal upon which the shaft rests and have been struck with the oddity of a draft to scale graven in the stone and outlined in gilt, perhaps the only such extant. It represents the method of raising the monolith to its present position and so does the shaft stand to-day, to them who read it truly, as a monument to those master quarrymen who hewed it from the living rock three thousand years ago and to the modern engineers who brought it from the Nile and set it on the Seine.

Does the imagination conjure up any vivid picture of our city fathers commemorating in like manner the remarkable engineering feat accomplished in transporting our own Cleopatra's Needle from Alexandria to Central Park and is there not here typified the essential difference between the status of the engineer in the French social scheme and in our own? If France, where the engineer takes his place quite naturally in the highest counsels of the nation, offers a contrast rather unfavorable to the Anglo-Saxon countries where engineering has but tardily gained recognition as a profession at all, the fault may not lie altogether at the door of the engineer himself but in this country may be mainly attributable to the survival of traditions from a more primitive generation when professions were so lightly assumed that it was no unusual performance for an individual to pass from one vocation to another and even to become successively teacher, parson, soldier, lawyer and statesman. But if to-day the engineer has achieved a perfectly definite status in industry, he still falls short of his rightful place in the wider scheme and this has been in part through his own shortcoming, an exaggerated modesty. He has been too prone to regard himself as a technical man *and nothing else*. The colleges have failed to recognize the circumstance that the youth who are attracted to an engineering career have commonly a higher order of imagination than the average and, forgetful that engineering is compounded of one part knowledge to two parts imagination, they have sent him forth with this faculty underdeveloped. If any there be who doubt this endowment, let them put it to the test.



Let them recall to mind that brilliant constellation of the Italian Renaissance whose renown as engineers has been obscured by their fame as sculptors and painters—Brunelleschi, the marvelous construction of whose dome at Florence is eclipsed by its beauty; Leonardo de Vinci, who would be better remembered as the father of mechanics, as inventor and pioneer in science, had he never put brush to canvas. Lost in admiration of Michaelangelo's frescos in the Sistine Chapel few reflect that their creator also wrought the system of fortifications, the mighty walls and towers that saved the last decades in the life of the Florentine Republic. One might add Swedenborg and expand the list indefinitely but without purpose as we have but to invoke such names in our own time and profession as Clarence King the prose poet, Rafael Pumpelly the archaeologist and that group of men of broad culture that King gathered about him on the fortieth parallel. And here I use the word culture in the sense defined by Matthew Arnold who knew whereof he spoke, as "the ability to walk all around a subject and regard it from every side." For the attainment of this faculty the mineralist is peculiarly fitted by the variety of his knowledge, by travel, by his acquaintance with all conditions of men, by all those experiences which tend to eliminate bias. We are all familiar with the legal type of mind, with the ecclesiastic, the academic mind, but, thank heaven, there has never been developed the engineering mind and if such an association as the Mining and Metallurgical Society can save us from it by promoting the ability to walk all around a subject and view it from every side this will be not the least of its achievements.

We are a small body and doubtless the aspiration toward a fuller life and greater usefulness may call for a larger membership but, few or many, the law must be fulfilled that like all organisms we grow or perish. There are two kinds of growth which to our profit we will keep separate and distinct in our minds. There is a growth by multiplication of like cells which increases mere size and culminates in that sublimest creation of the organic world, the giant sequoia of the Sierras. Yet to the hungry man the sequoia offers less nourishment than a single spear of corn. Then there is growth by segregation and specialization of cells and their coördination. This is development and it is notable that evolution in its crowning product, man, with due attention to appropriate stature, has avoided the extremes of feebleness and unwieldiness. The application to our own organization is obvious. It is this second mode of growth which concerns us most since it puts the emphasis on quality and leaves quantity to take care of itself.

If the stress here seems to be placed on structure rather than on function it is because, given a perfect structure, function will follow easily if not of its own accord, and if we attain the desired coördination of the specialized parts, the body as a whole will react with order and effect in response to any stimulus which may impinge upon it.

Some experience in connection with the New York Section has confirmed the advantage of numbers which is too evident to call for repetition and also made apparent the effectiveness of small groups when specific tasks are to be performed. It is a trite remark that larger bodies are best adapted to criticism and debate and smaller ones to constructive work and it has therefore occurred to me that those sections of the Society so circumstanced that they can muster but few members at one time and place have by very virtue of such limitation the opportunity for playing a highly useful part in the execution of a comprehensive program adopted by the Society. This indeed would be the consummation of that biological organism established ten years ago, of which the members form the cells, the sections form the organs and the Council the nerves that coördinate the parts in a complete unity. Moderate in size but closely organized, there is nothing that makes for a better and wiser conduct of the mineral industry which the Society cannot undertake and carry through to a successful issue and whatever it does for the mineral industry must extend throughout the body politic and society in general.

To test one's own attitude toward the body to which we belong it is worth while to frame an answer to the question of an outsider hesitating to join us—"What is there in it for me?" To this my reply would be, "Precisely what you put into it, neither less nor more. If you come seeking self-advancement you will find disappointment. If you come with gifts—a little thought, a little trouble, if need be a little hard work, you will find the ample satisfaction of the upright citizen who pays his debts, since in so far as you possess attainments that can benefit your fellows and you give them not freely, to that extent you remain in debt to the community."

This then is my confession of faith. In it I have uttered no new conceptions but have sought only to coalesce in concrete form the notions common to us all of the spirit of the Mining and Metallurgical Society of America. (Applause.)

There being no response to the chair's call for further business, the meeting adjourned at 10:00 p. m.

LOUIS D. HUNTOON,  
*Secretary.*

**Addenda.**—Some little time prior to the annual meeting, Charles Eugène Schneider was notified that to him had been awarded the Gold Medal for 1919. It so happened that one of the members, E. Gybbon Spilsbury, was in France at the time, and thus, through his kindness, it was made possible to make the announcement to Mr. Schneider in a more gracious manner than could have been done by letter. The Secretary is now able to print Mr. Schneider's cabled acknowledgment, and takes the liberty of printing therewith a translation:

*Vous serais reconnaissant transmettre à Président ainsi qu'a membres votre Société tous mes remerciements pour attribution Médaille d'Or qui m'est annoncée par M. Spilsbury. Serais heureux si circonstances permettent me rendre États Unis pour recevoir personnellement cette médaille dont je connais et apprécie toute l'importance.*

I shall be grateful to you if you will transmit to the President, as also to the members, of your Society, all my thanks for the award of the Gold Medal of which I have been informed by Mr. Spilsbury. I shall be happy, if circumstances permit, to go to the United States to personally receive this medal, of which I know and appreciate the full importance.

## COUNCIL.

### Meeting of January 2, 1919.

At the call of the President, a meeting of the Council was held at the Columbia University Club, New York, January 2, 1919, at 4 p. m.

Mr. Ingalls, the President, presided; other members present were Messrs. Channing, Dorr, Huntoon, Penrose and Sharpless. Mr. H. H. Knox attended the meeting on invitation. The Assistant Secretary was present also.

Approval of the minutes of the previous meeting of the Council, held on November 4, 1918, was deferred, a slight amendment having been suggested; the minutes of the meeting of the Executive Committee held on December 3, were approved as submitted to the Councillors in advance.

**Auditor.**—The action of the Secretary in employing Mr. Charles T. Howell to audit the books of the Society, at the cost of \$50.00, was approved.

**Remission of Dues.**—The Secretary reported that at a meeting of the Council, held on June 7, 1917, the following resolution was adopted:



That at the request of any of our members who are giving their exclusive service to the Government in connection with the European war, the treasurer be authorized to remit their dues.

It was moved, seconded and carried, that the above resolution be rescinded as of December 31, 1918, and that the following resolution be adopted:

That at the request of any of our members, who are enlisted in the service of the army or navy, the treasurer be authorized to remit their semi-annual payments, as required by the by-laws, during such enlistment.

**Amendments to By-Laws.**—The President reviewed the procedure which had obtained in connection with certain amendments to the by-laws which had first been submitted to the Council in the fall of 1917, and had been printed on page 272 of the December BULLETIN for that year. Additional amendments, together with slight changes to those previously considered, were then presented by the President; these were read by the Assistant Secretary and separately approved by the meeting.

(As these amendments, accompanied by explanatory statements, are printed under the heading of the annual meeting in this issue of the BULLETIN, they are omitted at this point.)

The Assistant Secretary was requested to draft the amendments as adopted and renumber the articles for submission to the members of the Annual Meeting, January 14, 1919.

**Raymond, Dr. R. W.**—The President and Secretary were instructed to draft appropriate resolutions of condolence and appreciation to be sent in the name of the Council to the family of Dr. Rossiter W. Raymond.

**American Engineering Service.**—The Secretary announced that the American Engineering Service, on which the Society was represented by the Assistant Secretary, had been dissolved by the action of the Engineering Council on November 21. He further stated that a co-operative employment bureau had been created by the four founder societies, and that their secretaries were to act as a managing board with W. V. Brown, of the A. E. S., as secretary. A full report has been prepared by your Assistant Secretary, who was secretary of the A. E. S. during nine months of its existence.

**New Members.**—It was reported by the Secretary that ballot No. 77 was polled on November 18; twelve votes were cast in the affirmative for each candidate; there were no votes in the negative.

## MINING AND METALLURGICAL SOCIETY OF AMERICA

The following were therefore notified of their election: Wilber Judson, Alexander K. McDaniel and R. B. Watson.

Also, that ballot No. 78 was polled on December 19; fourteen votes were cast in the affirmative; no negative votes. The following candidates have therefore been notified of their election as of January 2, 1919: E. E. Barker, E. H. Hamilton, T. G. Hawkins, Jr., and E. T. Stannard.

**Membership Statistics.**—The following schedule showing the status of the membership on this date was submitted for the information of the Council:

|                                               | Nov. 4    | Jan. 2    |
|-----------------------------------------------|-----------|-----------|
| Membership, January 1, 1918.....              | 301       | 301       |
| Members elected since January 1, 1919.....    | 22        | 26        |
|                                               | <hr/> 323 | <hr/> 327 |
| Members resigned .....                        | 7         | 14        |
| Members dropped .....                         | 2         | 3         |
| Members deceased .....                        | 3         | 4         |
|                                               | <hr/> 311 | <hr/> 306 |
| Applications before Council .....             | 3         | 4         |
| Applications before members .....             | 4         | 2         |
| Applications before Executive Committee ..... | 2         | 3         |
| Applications in office .....                  | 0         | 0         |
|                                               | <hr/> 320 | <hr/> 315 |

The meeting adjourned at 6:30 p. m.

LOUIS D. HUNTOON,  
*Secretary.*

### CHANGES OF ADDRESS.

Berry, E. S. .... Room 708, 111 Broadway, New York  
Boutwell, John M. .... National Copper Bank, Salt Lake City, Utah  
Brayton, Corey C. .... 2937 Magnolia Avenue, Berkeley, Cal.  
Fuller, John T. .... 1306 Main St., Honesdale, Pa.  
Mudd, S. W. .... 1208 Hollingsworth Bldg., Los Angeles, Cal.  
Pomeroy, William A. .... 803 Mayo Bldg., Tulsa, Okla.  
Robbins, P. A. .... 1001 Hobart Bldg., San Francisco, Cal.

## MEMBERS ELECTED IN JANUARY.

|                          |                                                                                                    |
|--------------------------|----------------------------------------------------------------------------------------------------|
| Barker, E. E. ....       | Cerro de Pasco, Peru<br>Supt., of Mines, Cerro de Pasco Copper Corp.                               |
| Hamilton, E. H. ....     | Midvale, Utah<br>Supt., U. S. Smelting, Refining and Mining Co.                                    |
| Hawkins, T. G., Jr. .... | 706 Mills Bldg., El Paso, Texas<br>Vice Pres. and Asst. Gen. Mgr., Am. Engineering & Operating Co. |
| Stannard, E. T. ....     | Kennecott, Alaska<br>Gen. Mgr., Kennecott Copper Corp.                                             |

## PERSONALS.

Lawrence Addicks received mention in a report of the Burma Corporation, Ltd., appearing in the *Engineering and Mining Journal* for December 28. It is stated that Mr. Addicks, as consulting metallurgical engineer, has made a complete report on the milling methods.

Percy E. Barbour, captain of Engineers, has been transferred to the 212th Regiment at Camp Devens, Massachusetts.

Alvin B. Carpenter has recently been elected a director of the Chamber of Mines and Oil, of Los Angeles. Mr. Carpenter is also one of the contributing editors of the *Mining and Oil Bulletin* published by the chamber.

J. Parke Channing left for Arizona on January 8, and is to be absent during the greater part of the month.

M. F. Chase is absent in France and will be gone for two or three months. Mr. Chase, it is understood, will investigate the present condition in the zinc metallurgical industry, with especial reference to the acid plants.

G. H. Clevenger, beginning with January 1, will be attached to the National Research Council in Washington. It is announced that the special work which he had undertaken for the U. S. Bureau of Mines has been finished.

George E. Collins reviews the mining industry in Colorado for 1918 in the *Engineering and Mining Journal* for January 18.

G. M. Colvocoresses, who is general manager of the Consolidated Arizona Smelting Co., at Humboldt, Arizona, is also associated in the management of the Ohio Copper Mining Co. in Utah.



About the first of the year, Mr. Colvocoresses made an inspection of the latter company's plant.

F. G. Cottrell was the recipient on January 17 of the Perkin Medal, at a meeting of the New York section of the Society of Chemical Industry, held in the house of the Chemists' Club. The medal was awarded to Dr. Cottrell for his distinguished service in chemical research. According to the public press, Dr. Cottrell took this occasion to describe a new process for separating atmospheric gases.

Benedict Crowell, in addition to his many duties as Assistant Secretary of War, has been delegated by President Wilson to take charge of the disposition of surplus supplies collected by the War Department.

Walter Douglas writes on the "Copper Production in Arizona" for the annual review number of the *Engineering and Mining Journal*, and Stanly A. Easton in the same issue covers the Coeur d'Alene district for 1918.

H. C. Hoover has been awarded the first John W. Alvord prize. This is known as the Washington Award for preeminent achievements in promoting the cause of humanity, and is to be bestowed annually on some engineer. It is also announced that Mr. Hoover has been raised to the rank of commander of the Legion of Honor.

W. R. Ingalls' appreciative memoir of Rossiter W. Raymond appears in the January 18 issue of the *Engineering and Mining Journal*.

Hennen Jennings, chairman of the committee appointed to investigate the gold situation, is reported to have submitted the report of his committee to Secretary Lane on January 5.

E. B. Kirby, who devoted so many months of his time to the work of the War Committee of Technical Societies, was absent from New York early in the year on a short holiday.

James McNaughton, of the Calumet & Hecla Mining Co., contributes a review of the copper industry in the Lake Superior district, for 1918, to the *Engineering and Mining Journal* for January 11.

John W. Mercer is stationed at Lyons, France, in the interests

of the American Red Cross. Mr. Mercer left the United States in September.

Arthur Notman was prevented from entering the military forces of the United States by the signing of the armistice. He had been examined and recommended for a commission in the engineers just prior to November 11.

M. L. Requa, late in December, received a loving cup from the members of his staff in the Oil Division of the Fuel Administration.

Edgar Rickard addressed the Washington section of the A. I. M. E., at its meeting of December 6, his subject being "Peace and Food." This address, and that of M. F. Chase, of which note has previously been made, appear in the A. I. M. E. *Bulletin* for January.

P. A. Robbins, who was general manager of the Hollinger mines in Ontario, has opened an office in San Francisco, where he will undertake the general practice of a consulting engineer.

F. F. Sharpless is the author of "Mining Engineers in the War," appearing in the January 4th number of the *Engineering and Mining Journal*. The article is illustrated with portraits of Crowell and Hoover, and relates the war achievements of many mining engineers—a large number of whom are members of the Society. Mr. Sharpless' name also appears as the contributor of "Labor and Mining, 1918" and "Chrome Ore in 1918" for the annual review number of this journal.

H. DeWitt Smith, who had joined the Aircraft Production Board, as announced in the December BULLETIN, has now returned to Jerome, Arizona.

George E. Stone, according to a recent announcement, leaves presently for Europe to investigate conditions affecting the zinc industry.

J. B. Tyrrell has been elected chairman of the Toronto branch of the Canadian Mining Institute.

Arthur L. Walker and W. R. Ingalls are the respective authors of the "Metallurgy of Copper" and the "Metallurgy of Zinc" in

the annual review number of the *Engineering and Mining Journal*. Mr. Ingalls also covers the bismuth industry in this issue.

Bulkeley Wells, of Colorado, was elected President of the American Mining Congress, which held its annual meeting in New York on December 10.

Pope Yeatman was in Cuba during the early part of January. He returned in time to attend the annual meeting of the Society.

George J. Young contributes an article entitled "Why Minerals Float" to the December 28 issue of the *Engineering and Mining Journal*. In the annual review number of this periodical, Mr. Young covers the 1918 tungsten industry.



# STANDING COMMITTEES

## Executive Committee

H. H. KNOX  
 LOUIS D. HUNTOON  
 W. R. INGALLS  
 R. A. F. PENROSE, JR.  
 F. F. SHARPLESS

## Gold Medal

E. GYBBON SPILSBURY, *Chairman*  
 J. E. JOHNSON, JR.  
 BRADLEY STOUGHTON

## Professional Training

ARTHUR L. WALKER, *Chairman*  
 F. W. BRADLEY  
 SIDNEY J. JENNINGS

## Mine Taxation

J. R. FINLAY, *Chairman*  
 E. T. CONNER  
 HERBERT C. HOOVER

## Standardization

C. R. CORNING, *Chairman*  
 J. PARKE CHANNING  
 GEO. C. STONE

## Welfare of Mine and Metallurgical Employees

J. PARKE CHANNING, *Chairman*  
 R. M. CATLIN  
 WM. YOUNG WESTERVELT

## PAST PRESIDENTS

|                                |                        |
|--------------------------------|------------------------|
| HENRY S. MUNROE.....1908-1909  | JAMES F. KEMP.....1914 |
| J. PARKE CHANNING....1910-1912 | W. R. INGALLS.....1915 |
| HENRY M. CHANCE.....1913       | J. R. FINLAY.....1916  |
| W. R. INGALLS.....1917-1918    |                        |

## FORMER SECRETARIES

|                            |                             |
|----------------------------|-----------------------------|
| J. R. FINLAY.....1908-1909 | W. R. INGALLS.....1911-1914 |
| HENRY S. MUNROE.....1910   | F. F. SHARPLESS.....1915    |
| LOUIS D. HUNTOON.....1916— |                             |

## GOLD MEDAL

|                                 |                      |
|---------------------------------|----------------------|
| 1914 { HERBERT C. HOOVER        | 1916 JAMES F. KEMP   |
| { LOU HENRY HOOVER              | 1917 E. P. MATHEWSON |
| 1915 ROBERT H. RICHARDS         | 1918 POPE YEATMAN    |
| 1919 (CHARLES) EUGENE SCHNEIDER |                      |



# Mining and Metallurgical Society *of America*



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February 28, 1919  
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## COUNCIL

At large, ex-officio,

H. H. Knox, New York.....Retires January, 1920

F. F. Sharpless, New York.....Retires January, 1920

Louis D. Huntoon, New York.....Retires January, 1920

Districts 1-2-3-4, New York, New England, and Eastern Canada.

W. R. Ingalls, New York.....Retires January, 1922

J. V. N. Dorr, New York.....Retires January, 1921

Pope Yeatman, New York.....Retires January, 1921

W. Lindgren, Cambridge, Mass.....Retires January, 1920

District 5—Pennsylvania.

R. A. F. Penrose, Jr., Philadelphia.....Retires January, 1920

District 6—Ohio, West Virginia, Maryland, Virginia, North Carolina, District of Columbia, and New Jersey.

R. M. Catlin, Franklin, N. J.....Retires January, 1920

District 7—Minnesota, Wisconsin, Michigan, Iowa, Missouri, Arkansas, and Kansas.

E. B. Kirby, St. Louis, Mo.....Retires January, 1920

District 8—Colorado, Utah, and South Dakota.

R. C. Gemmell, Salt Lake City, Utah.....Retires January, 1921

Districts 9-10—Northern California, Nevada, and Alaska.

Albert Burch, San Francisco, Calif.....Retires January, 1920

F. W. Bradley, San Francisco, Calif.....Retires January, 1921

District 11—Southern California, Arizona and Texas.

Ralph Arnold, Los Angeles, Calif.....Retires January, 1922

District 12—Washington, Idaho, Oregon, Montana, and Western Canada.

C. W. Goodale, Butte, Mont.....Retires January, 1922

## OFFICERS OF SECTIONS

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*Chairman.*  
Edwin Letts Oliver,  
*Sec.-Treas.*

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J. V. N. Dorr,  
*Vice-Chairman.*  
F. F. Sharpless,  
*Sec.-Treas.*

### PHILADELPHIA

R. H. Sanders,  
*Chairman.*

DOUGLAS, ARMITAGE & MCCANN, New York, Counsel for the Society.

# Mining and Metallurgical Society *of America*

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Vol. XII, No. 2

February 28, 1919

Bul. 129

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## ANNOUNCEMENTS.

**New York Section.**—The meeting of this Section, held at the Columbia University Club on the night of February 27, was unusually well attended and successful in every other way.

The subject for discussion was mine taxation and formal speeches were made by Professor E. R. A. Seligman, of Columbia University, and Messrs. Paul Armitage and Archibald Douglas. J. Parke Channing introduced the speakers.

Full report of this important meeting appears elsewhere in this issue, and should be read by those who have not a full understanding of the provisions of the new revenue bill as they affect the mining industry.

**Council.**—A meeting of the Council took place on February 3, at the Columbia University Club, to fill vacancies, to elect an executive committee and give further consideration to the program on Reconstruction; the proceedings appear on another page.

The resignations of two of the newly elected Councillors, W. H. Aldridge and J. E. Spurr, were accepted, W. Lindgren for Districts 1-2-3-4, and R. A. F. Penrose, Jr., for District 5, being elected in their stead.

As the three executive officers of the Society are ex-officio members of the Executive Committee, two other members only require annual election; Messrs. Ingalls and Penrose were unanimously chosen for the current year.

Two meetings of the Executive Committee were held on February 13 and 18, respectively, in furtherance of the Reconstruction program. Both meetings are reported in this issue of the BULLETIN.

**A. I. M. E.**—At the request of the American Institute of Mining Engineers, Messrs. H. M. Chance and W. Lindgren were appointed by the President, Mr. H. H. Knox, official representatives of the Society to the A. I. M. E. convention, held in New York on February 17, 18, 19 and 20.

## COMMUNICATIONS.

**J. Morgan Clements.**—Mr. Clements, who is in the Far East on behalf of the Bureau of Foreign and Domestic Commerce, Department of Commerce, writes to the Secretary as appears below. His letter is written from the American Legation, Peking, China, and bears date of January 14:

My Chinese teacher has just left and I have a few minutes to spare before going to dinner.

I have just come over to China from Korea, making a short stay in Manchuria on my way here. Was in Korea when the armistice was signed. The Japanese failed miserably in having any celebration in Korea. One Saturday they closed the banks but the schools and Government offices remained open. The small foreign colony in Seoul made up in enthusiasm for that lacking in the Japanese.

Am planning to get down into Southern China just as soon as possible. It is altogether too cold up here to do field work in any comfort at this season.

**H. W. Gepp.**—Under date of December 23, Mr. Gepp in writing to the Secretary sends "best regards and greetings to all friends" from Rigg and himself. The last paragraph of his letter reads as follows:

With best regards from Rigg and myself, who are both well but very much overloaded, and hoping for the return of some of our men from the Front very shortly.

**Geo. A. Laird.**—The following letter from Mr. Laird was addressed to H. H. Knox, President of the Society, and carried date of February 19. Mr. Laird advances a suggestion which, although not perhaps entirely new, does not often appear in print.

It has struck me a number of times that there must be some way in which we isolated members of the M. and M. Society can be of service in a general way towards furthering the interests of either the Society itself or the mining industry, yet I have never been able to get my foot on the right pedal.

If you can suggest, or lay out some general scheme whereby I can be of help, I would greatly appreciate it, as I can give the time, if nothing more, towards helping the cause.

There is something which has often occurred to me which I have wondered if possible of accomplishment, and that is the indexing of field work and engineers in such a way as to make it possible to ascertain whether a new field is worth seeing or not, from a purely personal point of view. As an example, I have seen fields, at an expense, which are not worth the cost of travel to them. Other fields are the reverse, and would justify the personal expense and time required for their inspection. If each member would report that he had seen such and such a district, and was pleased, interested or disgusted with it, while betraying no confidence it might discourage false reports or encourage worthy districts.

Personal equation would, of course, have much to do with the value of such data, but I believe that the members of the M. and M. Society could put up as authentic data as the U. S. G. S., at the same time, get it out as a "durante vita" in place of a "post mortem."



## OTHER SOCIETIES.

**Engineering Council.**—The conviction that the Engineering Council could not fully accomplish the objects in contemplation at the time of its creation unless represented in Washington has been held by a number of engineers. At least, this was the quite general feeling before the signing of the armistice, for during 1917 and 1918 it was the prime duty of all to assist the Government in every possible way. In this connection, what follows is therefore of considerable interest:

### NATIONAL SERVICE COMMITTEE.

*Announcement of a Washington Office.*

New York, January 22, 1919.

Engineering Council was created in the early summer of 1917, to provide for convenient co-operation among national engineering societies, for proper consideration of questions of general interest to engineers and the public, and for united action upon matters of common concern to engineers. In order the more completely to perform these functions, Council has recently organized a National Service Committee and established an office in the National Capital. This action was based upon a Tentative Plan for Representation of Engineers at the National Capital, submitted to Council at a special meeting on November 21, 1918, by Representative Philip N. Moore, of American Institute of Mining Engineers.

The present member societies of Engineering Council are: American Society of Civil Engineers, American Institute of Mining Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, United Engineering Society and American Society for Testing Materials. Other national engineering or technical societies are eligible for membership.

Engineering Council, through its National Service Committee and its Washington office, intends to accomplish the following general purposes, this committee acting always under the direction of the Council and within limitations fixed for it:

1. To discover public services which may best be performed by engineering societies, and, when desired, to offer the proper men for such services.
2. To speak authoritatively for Engineering Council before committees of Congress and departments of Government on all public questions of common interest to engineers, within such limitations as Council may set from time to time.
3. To give promptly, wide circulation among engineers of authentic information regarding pending legislation and executive actions which may affect the interests of engineers in any way.
4. To gather opinions of engineers on these matters.

Engineering Council's aim is disinterested usefulness to the Nation and the Profession—not advocacy of any selfish ends—to give unbiased information and counsel on technical matters, chiefly when asked. A modest start is being made. The work will be enlarged only as a real demand for services develops.

The members of the National Service Committee have been chosen so as to represent different parts of the country. The appointees are:

Chairman M. O. Leighton, Member, American Society of Civil Engineers, Washington, D. C.

C. B. Burdick, Member, American Society of Civil Engineers, Chicago, Ill.

George F. Swain, Member, American Society of Civil Engineers, Boston, Mass.

Philip N. Moore, Member, American Institute of Mining Engineers, St. Louis, Mo.

L. D. Ricketts, Member, American Institute of Mining Engineers, Warren, Ariz.

Andrew M. Hunt, Member, American Society of Mechanical Engineers, San Francisco and New York.

Andrew M. Lockett, Member, American Society of Mechanical Engineers, New Orleans, Louisiana.

W. C. L. Eglin, Fellow, American Institute of Electrical Engineers, Philadelphia, Pa.

Bancroft Gherardi, Fellow, American Institute of Electrical Engineers, New York.

The Washington office is 502 McLachlen Building, 10th and G Streets.

J. PARKE CHANNING,  
*Chairman, Engineering Council.*

## MEETINGS OF SECTIONS.

### NEW YORK SECTION.

#### Meeting of February 27, 1919.

The meeting of the New York Section which was held at the Columbia University Club on February 27 proved to be highly successful from every point of view. The attendance was quite considerably larger than is ordinarily the case and the discussion of the evening's subject, "Mine Taxation," was of the greatest interest as was evidenced by the close attention which the speakers received.

The selection of mine taxation, as treated in the new revenue bill, as the subject for this meeting, is in line with the program on Reconstruction adopted by the New York Section. Professor E. R. A. Seligman, Mr. Archibald Douglas and Mr. Paul Armitage were the guests of the Section, and made the principal speeches; the former dwelling particularly on taxation methods in general and the two latter confining themselves to interpreting the provisions of the complex legislation on mine taxation. Mr. J. Murray Clark, K. C., of Toronto, and other guests were called upon by J. Parke Channing, chairman of the meeting, to assist in the discussion.

The members, whose names follow, attended the meeting: S. H. Ball, Capt. P. E. Barbour, C. W. Boise, J. P. Channing, G. M. Colvocoresses, R. T. Cornell, J. V. N. Dorr, C. V. Drew, A. E. Drucker, L. C. Graton, L. D. Huntoon, W. R. Ingalls, J. E. Johnson, Jr., W. Judson, A. F. Keene, J. F. Kemp, H. H. Knox, J. V. Lewis, Capt. D. M. Liddell, C. S. Newcomb, H. M. Payne, R. Peele, A. H. Rogers, F. Rutherford, F. F. Sharpless, M. B. Spaulding, E. G. Spilsbury, G. C. Stone, J. A. Van Mater, A. L. Walker, A. P. Watt, H. H. Webb, and W. Y. Westervelt.

In addition to those named above, these guests were present: C. S. Ackley, C. F. Ayer, R. R. Eckert, J. K. Erskine, Jr., H. B. Fernald, E. Holloway, R. Lamson, C. A. Meissner, C. E. Mills, H. E. K. Moller, M. D. Reker, A. J. Ronaghan, F. Seymour, W. C. Schmidt, E. B. Sturgis, G. W. Tower, Jr., and L. Whiting.

**The Chairman.**—Members of the Mining and Metallurgical Society and guests, the subject of this evening is taxation as applied to the mining industry. I imagine that most mining engineers have had experience with taxation boards, in the states and countries in which they have operated, and have come to the conclusion that mines are something extremely difficult to value for the purposes of taxation, and you probably imagine that there is extreme difficulty about valuing a mine. Do not be carried away by that idea. There are plenty of other industries, the managers of which also imagine that their particular industry is something which it is extremely difficult to value and extremely difficult to determine the true taxation of. I think that probably the reason for our peculiar belief is that we look at the thing from a peculiar, a too-immediate, point of view, and that we do not know enough about the broad basic principles of valuation and of taxation. It is therefore with great pleasure that I introduce to you Professor E. R. A. Seligman, who will be able to give us some of those basic ideas.

**Professor Seligman.**—Mr. Chairman and gentlemen, when I was told by my friend, Kemp, that I was to speak to you on the general principles of taxation, I asked him whether it was because you were all so lacking in principles, i. e., so unprincipled. He assured me that that wasn't the fact and that I could go ahead on my own line, free from the ethical imputation involved. The chairman informed me that I am to talk about fifteen minutes, or twenty, and I am reminded of the fact that I give a course at Columbia occasionally on the principles of taxation which takes the whole winter. It is a little embarrass-



ing therefore to know exactly how to pick and choose, but perhaps if we confine ourselves to those broad principles which, even of little interest to you as mining engineers, may help to throw a light on some of your practical problems, it will serve us.

Now, the principles of taxation, of course, is a very big term. There are all sorts of principles. There are principles which deal with administration, principles of assessment, of certainty, of convenience of payment, and then there are principles which are connected with the economic results and the social consequences of taxation, such as the endeavor to secure economic efficiency, which is just as important in fiscal matters as it is anywhere else.

I venture to believe, however, that what interests you gentlemen above all are the principles connected with equality of taxation, those ethical principles of taxation which in a democracy are of the greatest importance and which make all the difference between justice and injustice. Therefore I shall confine my attention to-night to that problem which I would refer to as the questions involved in equality of taxation.

Now, the world has been struggling with that for a great many years. We are not the first to whom that problem has been presented, and the primary question here is, what is your test? In accordance with what criterion are you going to measure equality and uniformity in taxation? It is very easy to say as our laws have said almost from the very beginning—in Massachusetts Bay, I think that was the very first law that was passed in this country—that people should pay—there were no corporations in those days—that individuals should pay in accordance with their ability or faculty. And we all give lip homage to that conception. The ideal democratic conception is that equality of taxation consists in every man paying what he can afford to pay, and that is the criterion of what he ought to pay. But that does not help us much, because you will at once say, how are you going to measure a man's ability or faculty? Now we are coming a little closer, and are grappling with a difficult question. If we take a broad view of history we shall find that many different answers have been given to the question of how to measure the ability or faculty of people to pay. But, without worrying you with any historical disquisition, I shall mention just a few of the leading considerations. In the very beginning, in primitive society, we find the theory that everybody should pay according to his head, i. e., the poll tax. We find it in all the democratic communities at the outset,

and we find it to-day yet in a few countries as a survival. The United States is about the only country outside of Switzerland where you still find the poll tax. Of course, this criterion of people's ability to pay became antiquated and absurd as soon as property developed, because with the differentiation of property you have inequality between individuals.

So that went by the board. The next stage was one that you will find in the Middle Ages, when the great tax reformers despaired of getting all the people to pay taxes, and when the theory was, as they put it, *le fort portant le faible*, or that the rich man should bear the burden of the poor man. Of course it worked out practically the other way, for in the Middle Ages, under the system of exemptions in the *ancien régime* the poor man had to pay most of the taxes. Consequently, the reformers concluded that the only way you can reach the rich man is by taxing him upon what he spends, upon his expenditure; and as a result, for a long time, in England, in France, in Germany, everywhere, the ideal test of ability to pay was deemed to be expenditure.

This test again went by the board as democracy developed, for the simple reason that while the poor man must spend all he earns, the rich man is under no such compulsion. The opinion was soon strongly held, as is evident from the discussions on our income tax in Washington only a few years ago, that we must do away as far as possible with any tax on expenditures, except perhaps during a war when the object is to reduce consumption to the lowest possible limits.

With the disappearance of expenditure as a satisfactory criterion, the world came to accept the idea which we still find universally in our state laws, namely, that property is the test of ability to pay, and that everyone, including natural and artificial persons, as corporations, should pay in accordance with his property.

Let me here call your attention to the fact that property is really a legal term, not an economic term. Wealth of course is what we are after. When we say people should pay in accordance with their ability to pay, the idea is that people should pay in accordance with their wealth. Now, as all of you know, wealth may be measured in the terms either of a fund or of a flow. Wealth may be measured either in terms of capital or in the terms of income as it comes in during the year. For capital is nothing but capitalized income.

In England, under the feudal system, land could not be bought or sold. Therefore a man's wealth was measured in the terms of his rent—the rental of his estate. Today yet, England clings to this historic survival. When you speak of a man's wealth in Eng-

land and say he is worth 1,000 pounds, you mean 1,000 pounds a year. You measure his wealth in terms of what comes into him every year. In this country, on the other hand, the situation is different. When this country was constituted, the feudal system had disappeared except in a very few places where it survived only in small part. Land was everywhere bought and sold. Therefore it became possible to measure wealth in terms of property, which is nothing but capitalized income. From the very beginning therefore we developed in this country the system of property taxation.

Property was for a long time a very good test of ability to pay, in fact an admirable test under the early conditions of a simple economic life. It has certain advantages even today yet, as in local real estate where we can easily measure the value of a lot or of a house. You will find it in all early democratic communities, where there is a simple economic organization. After a while, however, as a result of modern economic life with its complexities, people began to find out that there were short-comings in this mode of measuring wealth. For instance, when you talk to an ordinary business man today you find that he is very much averse from measuring his business in terms of his property. What are the reasons for this? In the first place, in modern times where you have such an interrelation of economic conditions, so much speculation and so many hazards, the exact equivalence of capital and income does not always come about. Ordinarily, of course, a person's property, a person's capital is nothing but the capitalization of its present or prospective income. I venture to say, however, that if you were to compare the owner of a \$10,000 farm with the owner now-a-days of \$10,000 worth of some speculative stock, you would not find that their economic faculty, or ability, were precisely the same. There is often a disparity between income and the capitalization of income, due to these changes in our modern economic life.

Again, take the ordinary business man, whose capital consists of his stock in trade and his other property, either tangible or intangible. If you take capital or property as the test, there is no indication at all of attention paid to the rapidity of the turn-over, or the other factors affecting his profits. Here are two men with precisely the same stock in trade. Yet, one man may make ten times as much in a year as the other. So that some little doubt has been cast upon the alleged equivalence between actual property and the ability of the individual to contribute to the support of the state.

Furthermore, in modern society, we find other changes. In former times, as in early New England, every man worked and very



few had more than an insignificant amount of property. Now-a-days there are two divergences from this idyllic period. On the one hand, the careful and thrifty worker may accumulate some property, while the spendthrift, recipient of a much larger income, may spend his entire income and accumulate nothing. If you tax property, you hit the thrifty saver, and you exempt the wealthy spendthrift. In the second place, there are many individuals in modern times who secure their incomes from professional earnings rather than from property. **A** gets \$10,000 from his property or his business; **B** gets \$10,000 from his professional earnings. **A** is taxed and **B** pays nothing. Thus, you see that a tax on property is unjust as between those two men. It lets you fellows off too easily. You are perhaps not in that class; but when we think of our railway presidents with \$100,000 a year, of our Carusos and our Charlie Chaplins and the rest, and when we recollect that a tax on property lets them off scot free, more and more doubts are cast upon this criterion of ability to pay. Thus, you find that in all European countries as things became more complex they abandoned property as the test of ability. What then did they turn to next?

They turned to the produce of the thing itself. The thing was taxed. Whether it was a mine or anything else, they took the yield of the land, or the yield of the business, or the yield of the money, as the test of ability. First, and they did this as far back as Biblical times, they took the gross receipts. Of course, a tax on the gross receipts is very primitive because it pays no attention at all to expenses and does not put a premium on good management. Accordingly, they next took the net receipts, or the net yield of the taxable object, and they tried that for a long time. The trouble with net receipts, or net yield, as applied to a business, or anything else, was that it does not permit any attention to be paid to the personal characteristics of the owner of the property or business. Here are two men, **A** who uses his own capital and gets net receipts of \$10,000, and **B** who borrows his capital, or borrows half of it, and has to pay out of his net receipts a large amount of interest. Yet the net receipts, or net yield, tax—when you tax the thing, as the piece of land—doesn't pay any attention to the personal situation of the owner. It accordingly has finally been abandoned in modern times.

Thus, first in England, then in all other democracies, and finally in this country, we came to the taxation of income as the best test of ability or faculty. When this country needed a great additional revenue at the time of the war with England

one century ago, what did we do? We imposed a tax on property. When we needed a great revenue in the present war, what did we do? We imposed a tax on income. Why? Because our whole point of view has changed. Because modern economic life depends primarily upon income rather than upon property.

Now, in this country especially—I am not referring to our Federal taxes because some of our other friends will speak with authority on this point—I was asked to say a few words about the principles underlying our state and local taxation—in this country, we are in a stage of transition. This transition has been accomplished everywhere else in the world, in England, in Germany, in Austria, in Australia. France has just accomplished this result a few years ago; we on the other hand have only begun the transition.

What we therefore find in this country is that in most of our states we are still struggling with this problem of the determination of capital values. Some states have now gone over to this second stage and are trying to tax the yield or produce of the property. We see this in the taxation of mines in some states, where we find the tax on gross receipts. Other states then taxed what they call net receipts but what frequently is really not net receipts. Finally, some of the most advanced states have practically adopted what we are considering at present in the State of New York, namely, the tax on incomes.

All I have tried to point out to you in these few words is that your system of taxation, if you are endeavoring to secure equality of taxation, must be one that is in harmony with the economic facts of the day, and that an attempt to perpetuate an antiquated system, a system which was once an admirable system but which no longer responds to the economic environment, can by no possibility form an adequate, satisfactory test of ability to pay.

I do not wish to go into all the phases connected with the valuation of property for taxation, which is the practical difficulty with which many of us are coping in this country, because it is a transition problem. It is a transient problem. We can clearly see from this sketch of the historical development in what direction we are going and where the remedy lies.

If you measure wealth in terms of a flow rather than in terms of a fund you are getting much closer to the modern conception of justice in taxation. I venture to predict that in mines, as in other forms of enterprise, the problems of income taxation, difficult though they are, will gradually turn out to

be far less difficult and far less involved than the almost insuperable difficulties that confront us when we attempt in mines, as in other things, to measure wealth in modern times in terms of a fund.

What I would say in conclusion, is that, even though you have worked out your general principle or criterion of ability to pay, the practical solution of the difficulty depends upon your administrative system. Here again we are living in the early stages of a transition which has long since been passed in the more developed countries of the old world. In early times, taxes were farmed out and were collected by the tax farmers, such as the publicans of the Bible. In the next stage, we come to the local assessors, which we still have in this country. Finally, with the development of the principle of equality and uniformity of taxation, we get centralized assessors. The great struggle that is going on in this country today in mining taxation, as in every other form of taxation, is the attempt to secure equality by removing the administration of the tax from the hands of the poorly equipped local officials who are either inadequately versed in the minutiae of the subject or who, for other reasons, are perhaps not so much to be depended upon as are the more highly paid and more highly efficient administrators of the central government.

Wherever you have a successful administration of earnings taxation today—I won't say in mines, but certainly outside of mines—wherever you find a successful state income tax today, you will find it only where you have a centralized state administration, as in Wisconsin, as in Massachusetts and elsewhere.

And therefore, gentlemen, the two points which I should like to leave with you before sitting down is that in the solution of the mining tax problem it must run on all fours with the solution of all taxation problems and that it must certainly be in harmony with two principles. The one is that it must be in conformity with the facts of the changed economic environment of modern times. Second, that it must respond to the newer ideas of administrative efficiency. If you get a system which is based upon these two principles you will get about as close as you can to a just system. You will, however, never reach it, because, as the old adage says, "He who expects an honest tax to see, expects what ne'er was and ne'er will be." (Applause.)

**The Chairman.**—Professor Seligman has cleared up a point in my mind, and I am sure in a good many minds, about which I have never heard before. I can now see that undoubtedly the proper thing in a mine would be, if possible, to base taxation



upon the flow and not upon the fund, and if I may, as Chairman, I should like to call your attention to the practice in two different states, Michigan and Arizona. Of course, most states still say in their constitutions that everything shall be assessed at its full cash value. That is the old shibboleth that goes with every constitution.

In Arizona, it was found impossible to arrive at the full cash value of a mine. In Arizona, we have a tax commission and the tax commission has practically arrived at its figures as to the full cash value of a mine by simply using as a basis the annual earnings. The commissioners attempted at one time to consider the ore developed in a mine. They found out that the Inspiration and the Miami had their ore developed, which made it possible to establish a figure of their full cash value. Six miles off was the Old Dominion mine which only had one year's ore ahead. It was impossible to find an equation which would fit both those cases. So, what finally has been done is to take the annual product of the mine and then, with that as a basis and with the application of a formula, to arrive at what they call the full cash value for purposes of assessment. In reality they just do as Professor Seligman has said, base taxation upon the flow or the profits of a year.

In Michigan, they have tried to determine the full cash value of the property by determining the amount of ore in the ground. This led to very unfortunate results in the iron mines. One mine or one company, which was progressive and developed its ore ahead either by drifts or shafts, or by drilling, was penalized and had to pay a much higher tax than the man, or mining company, who was negligent and didn't keep ore ahead. The result has been to discourage the proper development of the mines.

I know of one very large company in Michigan whose general manager told me, "I dare not go ahead and develop my ore body the way I should. I have not developed my ore body so as to put my shafts in the proper place and put my levels at the proper points, because, if I did so, it would raise the assessment on my property—it would be unduly assessed." Therefore, that old fashioned method in Michigan of trying to arrive at the full cash value of a mine, in the same way that they would a store or a manufacturing concern, has led to grave inequalities.

The things that concern us very largely now are the question of the Federal tax—which is, of course, in its nature an income tax—and the question of excess profits, and I shall call

upon Mr. Archibald Douglas, who has given this subject a great deal of attention, to give us his ideas upon it.

**Mr. Archibald Douglas.**—Mr. Chairman, members of the Mining and Metallurgical Society and guests, if you will put yourselves in my place you will appreciate how extremely difficult it is to follow our scholarly Professor Seligman of Columbia University. Professor Seligman has submitted the theory of taxation in a lucid and delightful way and, judging from the applause when he sat down, he has done the impossible in making taxation popular. (Applause.)

In asking me to point out the theory of taxation under the most complex statute on taxation that the world has ever seen produced, you have put a great big problem up to me, and I am afraid that after following Professor Seligman you will find that my talk will be one of the driest in the world. You know the driest story in the world. One of my canny old Scotch forebears, who disliked to spend a penny, met a generous and convivial Irishman, and the Irishman said to him: "Sandy, will you come into the tavern and have a drink with me?" Sandy said, "I will, Mike"; so they went into the tavern. When they got inside, Mike found he had forgotten his change. That is supposed to be the driest story in the world! (Applause.) I believe mine will be almost as dry.

There are three forms of taxation provided for in the new act. There is the income tax, the pure, unalloyed income tax on individuals and corporations. Then we have the excess profits tax in addition to the income tax. Then we have a third tax this year only which is the war profits tax. They all have to be understood really to fairly and properly discuss the Federal theory of taxation.

On individuals and partnerships and personal-service corporations, that is corporations in which the earnings are made by the individual effort of the professional man, the law imposes two taxes, a normal tax of 6 per cent. upon the first \$4,000 of net income and 12 per cent. on the remainder, for 1918 and for each year thereafter 4 per cent. on the first \$4,000 and 8 per cent. on the remainder. Then in addition to that we have a surtax which, strictly speaking, we do not have in corporations and the surtax is a progressive tax beginning with one per cent. on incomes of \$5,000 and it progresses to 65 per cent. on incomes up to one million dollars. Now, with that tax, as a matter of fact, the corporation as such has nothing to do but if any of you carry on your mining ventures as individuals, or

partners, you would be taxed under this income tax as individuals.

Further I will point out this, that the form of corporation tax that we have here, the excess and war profits tax, is a tax levied exclusively upon the corporate form of organization. It is not a tax levied against the individual, or against the partnership, and the result of that is, as it works out, that, in operating a mining company through a corporation, you are taxed very much higher than if you operate that same company through the media of yourselves as a partnership. This fact has been taken advantage of occasionally in the southwestern oil fields, where some of the producers of oil have combined together as partners. Two or three of them have saved large excess profits taxes through partnership operation. Of course in operating as a partnership, you have inherent difficulties and the financial risk inseparable from partnerships. The corporate form is a far more satisfactory one, generally speaking.

In addition to the partnership and to the individual tax and the surtax, we have the tax on corporations. On corporations, the law imposes three separate and distinct taxes. It first imposes an income tax which for the year 1918 is 12 per cent. and for each year thereafter 10 per cent. Second, it imposes a so-called excess profits tax which tax is imposed on all of the net income of the corporation over and above what we call the excess profits credit. The excess profits credit is 8 per cent. of the company's invested capital plus \$3,000. The rate of this tax is 30 per cent. on the excess income up to 20 per cent. of the invested capital, known in the law as the first bracket (Sec. 312), and in the second bracket, 65 per cent. of the remainder of the income.

Now, for the year 1918, and for that year only, we have a third form of taxation known as the war profits tax. That tax is somewhat similar to the English, the French and the Italian war profits taxes. The general theory of the war profits tax as developed by the English in 1915 is this: England averages the earnings of any two of three pre-war years before this present war, the pre-war years being 1912, 1913 and 1914, and the excess profits tax was a tax of 80 per cent. on the income which exceeded the pre-war year's income; in other words, it was an excess profits tax of 80 per cent. Austria adopted that and made the tax 75 per cent. South Africa in 1917 levied an excess profits tax of 25 per cent. New Zealand, 45 per cent. France took the average of three pre-war years and made it 50 to 80 per cent. under varying conditions. Denmark and, I understand, Russia and Japan have all adopted this so-called excess profits tax. Then Germany adopted an excess profits tax—we do not know who will pay it—



and in the averaging of five pre-war years they excluded the year of the largest and of the smallest profits. Our war profits tax for 1918 is an alternative tax and is levied only in the event that it is greater than the excess profits tax. The amount of this tax is 80 per cent. of the net income in excess of the war profits credit.

The war profits credit—a different credit from the excess profits tax credit—is the average net income of the corporation earned during the three pre-war years of 1911, 1912 and 1913 plus \$3,000. In no event, however, shall this credit be less than 10 per cent. of the invested capital. If the corporation had no pre-war earnings then the act assumes pre-war earnings and states that the war profits credit will be 10 per cent. of the invested capital. After 1918 this special war profits tax is abolished and only the excess profits tax is levied.

The excess profits tax like the poor apparently is always going to be with us. It is insofar as we know a permanent tax and any idea that we are not going on with the excess profits tax as differentiated from the war profits tax is wrong, because the present act provides for a continuing excess profits tax.

I have pointed out the theory of our excess profits tax, I have pointed out that we have a net income tax, and I am going to show you how we make up the net income that is subject to tax, and how it is peculiarly made up in the case of mining corporations. In connection with depletion I will point out briefly what depletion is. Then after describing depletion, showing you how we arrive at it, I will briefly explain the theory of depletion and will show you generally how depletion is carried on the books of some of the larger mining corporations under the Treasury rulings; then, after determining and finding out what depletion is, how it is put upon the books, I will show you why it is difficult to get it into the hands of the taxpayer as capital. I hope that isn't going to be too difficult.

The net income of a corporation is ascertained by taking from its gross income certain so-called deductions. I want to go into this very briefly. These deductions are the ordinary expenses of the corporation, interest on its indebtedness, certain taxes, losses sustained, worthless debts, dividends received, depletion or wear and tear, and obsolescence. In the case of mines, oil and gas wells, other natural deposits, and timber, a reasonable allowance for depletion and for depreciation of improvements, according to the peculiar conditions in each case—you must note that—peculiar conditions in each case, based on the cost, including the cost of development not otherwise deducted. Each mining property stands in a distinct class by itself and the peculiar conditions in each case determine the amount of the depletion.

Generally speaking, the net income of the ordinary mercantile corporation is determined differently from the net income of the mining corporation in that the mercantile corporation does not have that item of depletion allowance. Having determined the net income of the corporation, it pays a tax as I have stated of 12 per cent. for the year 1919 and 10 per cent. thereafter.

Now, in making up the excess profits tax three factors are used. They are (a), your net income which is determined by the gross income less these allowances; (b), invested capital in its technical sense under this act; and (c), your excess profits credit. In making up "a" and "b", a mining corporation is in a position radically different from a mercantile or manufacturing corporation. In order to determine net income, depletion allowances must be as definitely ascertained as possible and must be claimed by the corporation at the time of making its income tax return, and must be carried on the books of the corporation as a depletion account under the directions of the Treasury Department. It is idle to point out to this meeting the meaning of depletion and the fact that a wasting industry, whose capital is constantly being drawn upon in the carrying on of its business, is not in the same class with a mercantile corporation whose capital remains substantially intact from year to year. The depletion theory in a wasting industry, in brief, is that each mine, gas or oil well has an original value based on the amount of mineral in the mine, or oil in the well at a certain date—that date may vary, as I will point out later—which mineral in the mine or oil in the well cannot be added to. Under this theory you first determine your original valuation, and thereafter for each ton of ore extracted or each gallon of oil taken out, the amount remaining is less in value and less in volume until after a certain reasonable period when all the mineral has been extracted or all the oil, covered in the original valuation, has been taken out, the mine or well for the purposes of depletion, under our tax act, will be exhausted and have no value whatever.

In other words, when you have gotten back your original valuation as capital then you have reached the limits of your depletion and you can't go ahead and further deplete. So therefore in distributing income from the operation of a mine or well, in order to repay to the investor his capital there must be set aside out of the income such sums as will at the time of the final exhaustion of the mine, or well, return to the investor his original capital.

It is this theory that we know in a wasting industry as the theory of depletion and the theory must be carefully distin-



guished from two other allowances made in the act. I refer to the allowance for depreciation, or wear and tear, and that of obsolescence—a word the Treasury Department loves to use—from obsolete. Obsolescence is an allowance made in the act for the scrapping of machinery or other equipment when it becomes obsolete, or out of use.

Your depreciation claim is frequently different in a mine than it is in the ordinary manufacturing corporation. A manufacturing corporation generally has an indefinite life. You may find in a mine, or more particularly in an oil well, that the average flow in an oil well is say five years and that the average life of your mine is say 20 years. Therefore your machinery, your buildings will be practically of scrap value after you have exhausted your well or after you have exhausted your mine.

In cases such as that it will be just as necessary to depreciate machinery or plant by the time that the mine is exhausted, as it will be to deplete so as to return the capital invested in the mine by the time of its exhaustion, and in making up the mining returns these facts must be borne in mind. Depletion has been already covered by quite a voluminous technical literature; Hoover and Finlay have ably considered the subject; it has had most careful study by very eminent men on the Excess Profits Tax Board; and the theories of depletion have changed from time to time. I will not go further into the theory as the following speaker will cover that.

The second factor to be determined is invested capital.

Capital as considered under the revenue acts of the United States has a highly artificial and limited definition, and consists of (1) cash paid for stock or shares, (2) tangible property paid for shares *at the time of payment* (not of today, but of some remote time in the past whenever the tangible property was transferred to the company), and (3) accumulated surplus, and, while the law does not specifically say so, it is believed that the Treasury Department will hold that all accretions in mining property will be held as accumulated or paid in surplus. The lower the ratio of net earning to capital the lower will be the percentage of tax on income; or, in other words, the larger the capital in proportion to the income of the company the smaller proportionate tax the company will bear. The company having a substantial capital would obtain a larger war or excess profits credit. For instance, if a corporation had a capital of \$1,000,000 the allowance of 10 per cent. of its capital in computing its war profits credit would be \$100,000, whereas, if its capital were only \$100,000, 10 per cent. of its capital would be an allowance of only \$10,000.



Both the act of October 8, 1917, and the new Federal act we must now pay our taxes under, limit the actual cash value of tangible property, other than cash, to the *par value* of the original stock or shares issued therefor, and so would seem to limit the capital of the company to its authorized total par value, plus its cash and surplus. So it was found in 1917 that a strict construction of the act would work a hardship on low capitalized companies, and such companies often found themselves in a position where their taxes were vastly in excess of the tax of other corporations having substantially the same net income. The injustice of this immediately became apparent, and you will remember with what consternation many of the low capitalized mining companies looked upon the acts as originally drawn. The situation in the past, however, was saved by the wise rulings of a board appointed by the Treasury Department, known as the Excess Profits Tax Board, which under specific regulations held in effect that when for any reason, owing to the low par value capitalization of the company, the tax paid by that company was unjust, that the company should take the same rate of tax as the tax paid by the representative corporations engaged in the same line of business (see Article 52 of Regulation 41), and that ruling of the Excess Profits Tax Board has been in effect incorporated into the present act, Section 326. This is a far step in the right direction. Another step in advance is the provision in this act that permits the valuation of a mining or oil lease as capital. Under the act of October 8, 1917, leases were declared to be *intangible* and not tangible property and so not entitled to a capital valuation. One remarkable case, corrected very wisely by the Excess Profits Tax Board on review, permitted a company whose shares were issued as full paid for a mining lease a capital of only \$30.00—the amount paid in cash for six \$5.00 qualifying shares—although the mining lease had a net return for the year 1917 of \$30,000. The new act does away with such anomalies.

The peculiar problem of the mine owner is the required valuation of his mine at the time of the transfer of the property to the company, or on March 1, 1913, and in passing let me say that March 1, 1913, as used in the Revenue Act, is not an arbitrary date but is the date when our Constitution was amended so as to permit the taxation of income under the present revenue acts.

In order to ascertain the capital of a mining company under the Revenue Act, it is necessary for the mine owner to be able to prove the "actual cash value of tangible property other than cash bonafide paid in for stock or shares at the time of such payments." Including paid in or earned surplus, it, therefore, becomes necessary for the mine owner to prove by valuation that his mining property

on say March 1, 1913, had a certain definite tangible value. This cannot be done by an appraisal of any definite assets, as the great body of assets consist of the ore, or oil, or other mineral products hidden in the bowels of the earth, so that the most that can be done is to get opinions from qualified experts or mining engineers who, reasoning from their geological knowledge plus the valuations made by them of ore blocked out or probable, conclude that sight unseen the value of the mining property is at least worth a certain definite sum, which sum will be used for the purpose of making up a capital valuation and of basing claims for depletion returns made to the Government. This valuation must be often sustained or defended by expert evidence. Of course, in a great majority of mining enterprises, the actual cash originally paid for the properties is small, and it is only when a success has been made in finding ore and making a discovery that the difficulty of proving invested capital seriously arises.

The valuation placed on a mine property by the mining engineer you can therefore appreciate in many instances determines the success of the mine as an investment for its stockholders.

Let us assume that the mining engineer places a capital valuation of \$1,000,000 on a property. That would give the company ultimately the right to return to its stockholders in the way of a depletion distribution \$1,000,000, and would save it from paying an income tax on its depletions year after year. Say, however, that on the other hand the mine was only given a valuation of \$100,000 and depletion to the extent of only \$100,000 was allowed. You can see that given the same income there would be a loss to the extent of taxes on \$900,000, as the company would have to pay an income tax on \$900,000, and that eventually, theoretically at least, the stockholders would not be able to receive that \$900,000 back as capital without tax, but would receive it as a taxable income return.

To return to the question of depletion, the taxpayer in making up his report makes a definite claim based on valuation. Under the rulings of the Treasury Department, this claim must be carried on his books so as to show clearly the amount of depletion.

*Depletion* is figured per unit of ore extracted during the year. The unit may be a ton, pound or other convenient and recognized unit. To determine the rate of depletion per unit, the taxpayer is required to value the mine as of March 1, 1913, if acquired before that date. He likewise furnishes an estimate of the number of units therein. This includes both blocked out and prospective or probable ore. The total value as of March 1, 1913, is then divided by the total number of estimated units in the property which gives the rate of depletion per unit extracted. The total yearly depletion is

then determined by multiplying the number of units extracted during the year by this rate. The way this is handled on the books of the company is as follows:

The value of the property is set up as a surplus account. It is credited to surplus and debited to an account called mining claims. In addition to this, the law requires that a special account be kept. The purpose of this special account is to advise the Treasury Department and the company when the annual depletion deductions equal the total value of the ore body so set up. This account is credited yearly with the amount deducted each year as depletion, and when the total of these deductions equals the value of the property as of March 1, 1913, no further depletion can be taken.

Of course when the property has been acquired since March 1, 1913, then the actual cost of the property, including any addition in costs or development or exploration work, is taken in lieu of the value.

For example: A mining company sets up a valuation as of March 1, 1913, of \$10,000,000, divided, let us say, into 1,000,000 tons representing the estimated number of tons of mineral deposits in the ground on March 1, 1913; each ton having, therefore, an estimated value of \$10.00. This valuation of \$10,000,000 would be arrived at from an estimate of the mineral deposits in the ground, an estimate of the percentage of the ore and an averaged selling price.

Let us say that during the year the mine takes out 60,000 tons of ore at \$10.00 per ton. There would, therefore, be charged to depletion \$600,000. This sum would be claimed as a deduction from the net income of the mining property and would be set aside as a depletion fund to be invested or distributed to the stockholders of the company.

The above illustrates the typical way in which the depletion is arrived at and in which the books of many mining organizations are kept. Some other organizations have other methods of keeping their books so as to show this depletion reserve. When the sum of the yearly depletion reserves reaches the original assumed value of the mine, say \$10,000,000, no further depletion under this depletion theory is possible.

Now we have arrived at the point where we have our net profits and our depletion, and now we have the depletion set up on our books and the problem is to get that depletion, if it is desired to do so, into the hands of the stockholders.

The old reasoning was, and it is correct reasoning, that this depletion was set aside as capital, that it is there and that, in turning



it back to the stockholders, it was a return of capital, that it was not income and therefore was not subject to the income tax. That it simply returned to the stockholder what he had contributed, he had received his capital back and made no profit.

Reasoning on the theory that the depletion was a reserve against capital and not therefore income in any sense, the obvious procedure that was followed by mining companies was to distribute the depletion reserve as a depletion or capital return, and to make it a return separate from the income of the company and a separate depletion return. The stockholders receiving this return on account of depletion and making their income tax returns made the claim that this was a return of capital, and therefore, not subject to tax under the income tax act. The theory was undoubtedly sound. The Treasury Department found, however, that a substantial part of the income of mining companies was being returned to the stockholders as depletion dividends so they immediately set about constructing rules and regulations to defeat this distribution as capital, and the result of the various rules and regulations promulgated by the Treasury Department is now incorporated in the present act. The Treasury Department took the position that all distribution made by a mining company should be considered to have been distributed from the net earnings of the company excluding depletion, until all of the net earnings were exhausted, and that it was not until all of the net earnings were shown to have been distributed as dividends would the Treasury Department consider a distribution made as a depletion distribution. The practical effect of this ruling up to date has been to tax all dividends of corporations, whether declared as depletion distribution or otherwise, as paid out of net earnings and not out of depletion. The present Act, Section 201, reads as follows:

(b) Any distribution shall be deemed to have been made from earnings or profits unless all earnings and profits have first been distributed. Any distribution made in the year 1918 or any year thereafter shall be deemed to have been made from earnings or profits accumulated since February 28, 1913, or, in the case of a personal service corporation, from the most recently accumulated earnings or profits; but any earnings or profits accumulated prior to March 1, 1913, may be distributed in stock dividends or otherwise, exempt from the tax, after the earnings and profits accumulated since February 28, 1913, have been distributed.

There is just a possibility under a recent decision of Judge Mayer, rendered after a very carefully, well-written opinion in the United States District Court for the Southern District of New York, that, by distributing your depletion dividends as stock dividends in the stockholders' hands, they will not be taxed as a dividend, at least until such time as the stockholder has sold his stock and realized on it.

I think that I have covered the general theory of our income tax law in its application to mining. I have touched very lightly

upon the principles of depletion or the principles of mine valuation. I am leaving that for Mr. Armitage, but, generally speaking, I hope I have made myself clear and that you have followed me. As a matter of fact I think very many of you here are fully as familiar with all this as I am.

I want to point out to you, however, that this is an extremely complicated act. I just want to give a little example of what some of you poor fellows are up against in trying to make your returns out. You know this act should be clarity itself. It goes to millions of business men, the tax is assessed upon hundreds of thousands who have got to make their returns under it.

The earlier English act is a most admirable act. It should have served as a model. I say that advisedly, the English of that act is lucid and clear and fair, there are no undue exceptions and it is fine—it is a fine English statute. But this act of ours, made up as it is of a sort of compromise between the claims of the Senate and the claims of the House and a compromise between Senator This and Congressman That, each one having a constituency to represent and certain local interests to look after, becomes a great higgledy-piggledy, hodge-podge that is very difficult to wade through. It is like a labyrinth. Somebody has said that the income tax act was like one of the labyrinths at Coney Island, and a Washington paper in a cartoon showed this labyrinth and one of the deluded wanderers lost in it was shown as sitting down on a seat labeled “depletion” and was feeling very much rested.

This clause I am going to read to you some of us have determined what it means, but to the average business man it is just about as sensible as the algebraic formula  $x^2+11x+53=11/3$ . The business man knows there is a value to  $x$  and has to educate himself to work it out. I will just read this—there are a good many other clauses equally clear:

In cases in which the tax is, to be computed under this section, if the tax as computed without the benefit of this section is less than 50 per centum of the net income of the taxpayer, the installments shall in the first instance be computed upon the basis of such tax; but if the tax so computed is 50 per centum or more of the net income, the installments shall in the first instance be computed upon the basis of a tax equal to 50 per centum of the net income. In any case, the actual ratio when ascertained shall be used in determining the correct amount of the tax. If the correct amount of the tax when determined exceeds 50 per centum of the net income, any excess of the correct installments over the amounts actually paid shall on notice and demand be paid together with interest at the rate of  $\frac{1}{2}$  of 1 per centum per month on such excess from the time the installment was due. (Laughter.)

Generally speaking, however, the act is a great advance over the former act of 1917.

In a brief talk of this kind, I can only touch the high spots, but I hope that I have made myself clear. (Applause.)

**The Chairman.**—After so much clarity, it seems impossible that we could get, by any possibility, any more information upon the subject, but we will make assurance doubly sure, and I shall ask Mr. Paul Armitage to amplify the pellucid remarks of his predecessor.

**Mr. Armitage.**—Mr. Chairman and gentlemen, I want to limit my remarks entirely to the question of depletion, particularly under the peculiar wording of the present law.

There are certain features of that which are new and novel and I think may not have been brought to your attention. I shall confine my talk entirely to that subject, and will therefore refer only to those sections of the law that cover it.

There are two characteristic questions which the mining engineers have to meet in determining this tax, one is the valuation of mines. I think you gentlemen are far more familiar with the methods of accomplishing that than we are. We will have to call upon you to help us out on that subject.

The other is the question of depletion. That is the other burning question the mining men have to meet under the income and the excess profits tax law.

Now, why is that such a burning question? Why is that so important? Why must we determine this depletion? Why are we so anxious about it? Why do we talk about it? The reason is simple.

Depletion is a deduction from our income. The law is a tax upon our net income. And, therefore, the larger we can make the deductions from that income the less we will have to pay a tax upon, and therefore depletion is in the nature of exempted income and the larger we can make our depletion the more exempted income we have.

There are three theories of depletion.

The first is what I might term the "accountants' theory." That is the theory that depletion is the return of all the capital invested; the cost of the article. In that sense it is analogous to the cost of raw material to the manufacturer. As the tax is levied only upon the net income, we must necessarily determine the cost and deduct that from the gross income. This is the accountants' theory of depletion, the ordinary theory.



That theory as applied to the complexities of modern business has entirely failed. As applied to the income tax it has entirely failed, and the reason it has failed is simple. In the first place, it is practically impossible to determine the cost of a mine and by the cost I mean the original cost. The only exception is in the rare case where the mine is bought for cash and that cash is paid within a recent time so that it is known. In other cases, we cannot go back into the early history of the mine, begin with the original prospector who put in his little sum of money and trace it down to the last corporation that has built its great smelter to-day, and so ascertain the cost of that mine. That is an insuperable task. Let me give you one instance of the difficulties. What are we going to include in that cost? Are we to limit the cost to the actual expense that has been incurred in developing that particular body of ore, or are we to go further and to include in that cost the unsuccessful attempts to discover bodies of ore in the neighborhood or elsewhere. This should justly be allowed in determining cost because it is, not only the successful attempt that represents the cost of the mine, but the unsuccessful attempts as well. The cost of these should be added. And when we then start to add, where are we going to stop? Are we to stop with the unsuccessful attempts of that particular corporation, in that particular neighborhood, or are we to go into all the unsuccessful attempts of the particular concern elsewhere? You can see, gentlemen, that it is impossible to determine the cost.

There is another reason why the cost theory of depletion is impractical. That is because it assumes that the ownership of the mine remains the same during the entire time. Now, that assumption is untrue as applied to a modern corporation. There is a constantly fluctuating personnel of stockholders, changing from day to day and from year to year. These stockholders invest their money at varying rates and in different amounts. These different rates and different amounts are each a different investment of capital. Therefore, while it may be proper to say that the original cost is so much to the man who paid fifty cents for his shares, it is grossly unjust and grossly unfair to the man who has paid recently \$200 a share—that is, the basis on which he has invested his money in that organization. To say that the mine is only worth fifty cents a share, to capitalize it at fifty cents a share, when he has invested at \$200 per share is unequitable.

There is a third reason why we cannot apply that theory. That is the reason that has been referred to by Mr. Douglas.

The Government cannot tax the principal and income which has accrued since March 1, 1913, because prior to that the U. S. Constitution did not provide for any income tax. Therefore the covenant had no right to tax income which had accrued before that date. Hence, in allowing for depletion, there must be allowed more than the original cost of the mine which has been acquired before March 1, 1913. That is, we have to allow as the additional, the increment of, value which has accrued in that mine up to March 1, 1913. That increment of value up to March 1, 1913, is not income that is taxable, it is capital after that date and cannot be taxed.

Well, the law recognized this constitutional difficulty, the Treasury Department recognized it. So it created a different and new theory of depletion. That takes us to the second theory of depletion. That theory is what I shall denominate the "statutory theory of depletion." That is the theory which says, "We will allow the man who has bought his property, or the corporation that has acquired its property, before March 1, 1913, to deplete the value of March 1, 1913, but everybody else must deplete on the basis of the cost.

Now, that theory is not a practical theory, it is not a just theory, it is not an equitable theory. The reason is this; that we have two definite and distinct modes of measuring depletion; one applied to the man who has acquired since March 1, 1913, on the basis of cost, giving him no increased value over cost, giving him nothing but what he has put into his mine; the other giving to another concern which has acquired its property before March 1, 1913, the value as of March 1, 1913. This is more than the cost. This allows to be added to his cost the value of after-discovered ore. That isn't a just test of depletion, it is a perfectly artificial method of determining depletion based solely on the date that one man, or concern, has acquired his property. As a practical proposition it produces all sorts of inequality and injustice. It allows one that acquired his mine, we will say, before March 1, 1913, to include the value of the ore reserves right up to March 1, 1913, and denies the other, who has bought his mine, or discovered it, after May 1, 1913, any additional value that I have discovered. It limits him solely to the cost.

The result is that the law has utterly failed in the effort to apply these two distinct theories of depletion. The net result has been confusion, inequality and injustice.

Now, these theories find their source, it seems to me, in an entirely erroneous concept of a mining property—a concept which has arisen in part from some statements of certain eminent

mining engineers and partly from the wrong aspect in which we view mining property. One eminent mining engineer said mining property was like a bank account in a bank being wound up by a receiver which was to be paid out to depositors. He referred to it as "an asset in the process of dissolution." Now, I say that that isn't the correct angle of view. Mining property isn't that sort of an asset. It isn't that sort of an enterprise.

A great mining corporation of the present time isn't a corporation in the process of dissolution. It is not the duty of the directors of that concern to get out that ore as rapidly as possible, sell it, and distribute the profits among the stockholders and dissolve the company. If they do, at the end of a short period of time their corporation will be dead, their mine will be dead. Any great mining corporation of the modern day is a continuing enterprise. The directors and the stockholders and the managers of that mine ought to so arrange its affairs that it will go on permanently, that it will have a fund to keep it alive as a going concern. It is not their sole duty to extract all the ore from the mine, sell it, and distribute the proceeds to the stockholders. The directors should set aside a portion of the funds to acquire and develop new mines, discovered or purchased, so that the concern keep going on indefinitely, forever.

It is that wrong aspect, it seems to me, of approaching the mining industry which has produced these concepts of depletion which I have referred to.

The third theory of depletion is this—"depletion is a reserve for replacement." It is a reserve that should be set aside by the mining corporation for the purpose of continuing the life of that enterprise, of acquiring new property, of acquiring new ore bodies, in discovering them, developing them, not a fund to distribute among stockholders. If that is the correct theory of depletion, if this is its purpose, then depletion should not be confined to the original cost but should extend to the form of a present day value of the ore reserves. It should be a fund that will enable us to replace the ore which we have taken out from year to year on the basis of the present value. This would permit a reappraisal of ore bodies at the beginning of each fiscal or taxable year and deplete upon that basis. This would establish a fund with which we could replace these bodies and which, set aside, could be used by directors and managers to acquire new ore bodies, to discover and develop existing ore bodies, and continue the industry.

This theory brings us face to face with the disputed question, what is capital and what is income? Professor Seligman has



referred to this. In his definition of income he refers to it as a flow as distinguished from capital which is a fund at a stated time. I agree entirely with that. I think that is exactly the distinction between income and capital. You cannot define income without adding the element of time. If you ask what is a man's income, it is the amount of money he earns for a given period. Therefore, the definition of income must be the amount that comes in over a stated period. Any definition of income must state a definite period of time. The income tax law recognizes this fact. The definite period over which the tax is to be imposed is the "taxable year." Therefore I say this, that anything which you have acquired in the preceding period or year—I don't care how you have acquired it or where you have acquired it—is not taxable except within that taxable year. In a mine, the ore body developed, discovered, or blocked out is earned in the year in which that discovery, blocking out, or development, is made.

The Treasury Department up to date has consistently refused to recognize this. It says that there is no income until you get the ore out and sell it; it then becomes income, from that date. It says in that year in which the ore is sold, the income is earned. That is radically and fundamentally wrong. That income was earned the year that you discovered that ore body, developed it, blocked it out. It should be allowed in that year. The value of the ore body at the beginning of the taxable year should be allowed as capital, and that value should be fixed as the value for depletion.

When the Congress came to formulate this last act, the mining industry appointed a committee to endeavor to get some better provision for depletion than in the old law. I was a member of that committee. We endeavored to get in the law this idea of a fund for replacement. We suggested that there be an allowance for depletion and, in addition, a fund for replacement. We used these words and, if you will permit me, I will read them—this was our suggestion—"first, reasonable amounts for depletion and, second, reasonable amounts to replace the ore mined during the year equal to the estimated cost of replacement of a like quantity in the ground." Congress declined to do that. We then suggested that they give us an allowance in the form of "a reserve for hazard," as we called it. That was the same idea. Hazard was the extra cost of developing, or discovering, new bodies of ore over and above what the old one had cost. We got that in the bill as applied to oil. If you will remember, it was put in the bill in the House and was stricken out in the

Senate. We finally succeeded however in getting a reasonable allowance for depletion, which is on the basis of the cost including the cost of development. And then they added this clause. This is one I wish to call your attention to particularly because I feel that this is really a decided step in advance, and if properly used and properly administered will help the mining industry greatly. I will read it:

Provided further, that in the case of mines, oil and gas wells, discovered by the taxpayer, on or after March 1, 1913, and not acquired as the result of purchase of a proven tract or lease, where the fair market value of the property is materially disproportionate to the cost, the depletion allowance shall be based upon the fair market value of the property at the date of the discovery, or within thirty days thereafter. (See Sec. 214, (a) (10).)

At first blush this seems to be of no service. What is the value of property thirty days after discovery? Thirty days after discovery you may say that it has no value. That was my first impression when I read the thirty day limit. It was originally within twelve months, now it is thirty days. But if you notice here, it is discovery of a mine. It is not the discovery of ore, not the discovery of a vein or lode. "In the case of a mine discovered by a taxpayer," it says; now, a mine is not merely the discovery of ore—that is not discovery of a mine.

The word "mine" has two very clear and well settled significations. In the first place, "mine" means an excavation, a hole in the ground for the purpose of getting out ore from the ground. That is *not* the meaning or sense in which it is used in the law, you can see that clearly. Because in that sense, no mine is ever discovered. No man ever discovered a developed mine, except perhaps in some rare case where some wanderer in the wilds of Mexico, or Peru, discovered an ancient mine that had been abandoned. The other meaning of the word "mine" is this, an abundant quantity of something, a great store of something, as for example if I should say—of course, I only use this by way of illustration—my friend Mr. Channing here is a "mine" of wit. That is a well recognized sense of the word. Using "mine" in this sense, the law means this—in the case of a mine discovered by a taxpayer—an abundant store, a great quantity of ore. That means that the taxpayer has done more than merely discover ore, he must have discovered a quantity of ore, a great quantity of ore, a sufficient quantity to warrant the undertaking of a mining operation. That is what the law means when it comes to drafting regulations under this Act. We insist that that is what the law meant, and the Treasury Department has adopted that idea.

I just to-day got a copy of their regulations. These are regulations just produced, just published, by the Treasury Department and they define what they mean by discovery of a mine, and they say this, "the discovery of a mine or natural deposit of mineral ore shall be taken to mean **A**, the bona-fide discovery of a commercially valuable deposit of ore"—just stop there, any ore is not commercially valuable, it must be commercially valuable deposit; "**B**, the development and improving of a mineral or ore deposit which has been abandoned, apparently worked out, sold or leased or otherwise disposed of based on a sample from the development of a body of ore or mineral of sufficient size, quality and calibre to determine by examination that the physical and geologic conditions indicate that it is going to be a commercially valuable deposit of ore."

This is exactly what I observed a moment or two ago—it must be an ore body of sufficient size to warrant beginning mining operations. Now, let us see where all this has brought us—how much progress we have made toward our port. Let us see what that means. That means that every man who has discovered his body of ore by March 1, 1913, gets full value as of that date for depletion; and every man who discovered a body of ore after that date gets full value under this clause for purposes of depletion. In other words he gets just exactly what I have stated as the third theory of depletion, a replacement value.

There is only one other thing that at first seems not to be covered in this law, and that is the question of extension of existing ore bodies in depth. It is not in the law in that form. But we get that anyway for this reason. The law says that the value for depletion is the market value of the property as of March 1, 1913. In determining that market value of the property on March 1, 1913, there is included both proved and prospective ore. In prospective ore is included the value of the extensions of existing known ore bodies. Therefore you will get it there. If the property was discovered after March 1, 1913, it shall be based upon the fair market value at the date of discovery or within 30 days thereafter. You would get that in valuing the property at that time by including in an estimate of the probable ore.

So, gentlemen, you see, into this law has been woven the idea of a replacement fund. We all should urge it, we all should claim it from the Treasury Department, we all should insist upon it, because we are entitled to it. The mining industry must be allowed it, if we are not to come to an untimely end. (Applause.)

**The Chairman.**—Gentlemen, this finishes the more formal



part of the meeting. The three principal speakers of the evening have spoken and the subject is now open for discussion by anyone here. Mr. Fernald, can you give us some suggestions from the accountant's point of view?

**Mr. Fernald.**—Mr. Chairman, while listening to the discussion, and particularly to Professor Seligman's definition of Capital and Income, I was strongly reminded of the first time we ran into this in the old 1909 law, especially as it referred to mining properties. We had numerous discussions with the Commissioner of Internal Revenue, and he was almost persuaded to adopt the theory that the first income derived from a mine should be considered a return of capital; that you do not receive income from a mining investment until you are "on velvet." There is a great deal of sense in that, of course, and it was very strongly urged upon him by many people who had themselves considered it in this way in their own personal accounts. It came so near being adopted that it would have been, I believe, if somebody had not started doing a little thinking, and a little figuring, as to "where, then, are we going to get this 1 per cent. income tax?" So, unfortunately, as we then thought, but fortunately, as we now know, the Commissioner did not approve it. After a great deal of discussion, he finally decided on the "Unearned Increment Theory" which, appearing as it does in this present Questionnaire, causes some to ask "Unearned Increment? What is that? What does it mean?" When the Commissioner approved it, he apparently did not appreciate what it meant and what its effect was going to be on the incomes of mining properties, and when the Treasury Department found that there were a great many mines which did not return any income, this later theory was abandoned and we were governed by the old 1909 law, accepting depletion as depreciation. We thought it was all settled, until the Supreme Court decided as follows: "That is all wrong. You do not have any depletion under the old law." Thus, today we are racking our minds and wondering whether we paid that additional assessment and whether, as a result, our pre-war income for the years 1911 and 1912 was raised because of the disallowance of depletion under the old law.

Then the 1913 law became effective with its 5 per cent. limitation and the question as to what is gross value. When we asked the mining engineers "What is gross value?" they said, "Gross value? Why, it's gross value." But the Treasury Department said, "Oh, no! Gross value is not gross value. It is something else." Well, it was only 1 per cent. and I guess most of us paid it.

Then the 1915 law arrived with its question of values as of March 1, 1913. With this theory, "capitalized income" was introduced. That is the basis on which I think all of us worked, and when we come to think the matter over that is just what the value of a mine is.

When this question first came up, we used to fight against the old regulations which required that it should be on the books. I think that most of us said, "Why, if we enter this on the books we are going to show that we are paying dividends in excess of our profits. We can't do that." But the Treasury Department concluded by stating "You must." Then we wondered that "If we entered that on the books and charged up depletion against profits, what is going to happen? We will pay dividends out of the profits we have received and then we will have part of the money left over. But what is that? That is the return of capital." So we said "Fine! We will do just what the Treasury Department requires, and we will enter it upon the books." We therefore did it, and the Department went into the matter and, after many questionings back and forth, finally said "You are right. If it is not income, it is return of capital based on what the property cost or its value on March 1, 1913. It is not income; you can pay it out as return of capital."

This merely outlines in a rough way some of the various difficulties we have been through with our tax matters. As to the question of appreciation, I wish I were as hopeful as Mr. Armitage is as to what the Treasury Department is going to say. I am trying to hope for the very best. I do certainly agree with Mr. Armitage that we ought to try to stand together and impress the Department that our theory is a reasonable one, and that it is not a case of each one having a different theory, and a different idea, as to what all this means. By doing this, the Treasury Department will be unable to say "There is just one theory all these people have and that is not to pay a tax." (Applause.)

**The Chairman.**—There is a gentleman with us from our neighboring country, across the line. I would ask Mr. J. Murray Clark of Toronto if he can give us some ideas, or some enlightenment, on what Canada has been doing.

**Mr. Clark.**—Mr. Chairman, I must say at once that I can give you no enlightenment as to the construction of the clause that Mr. Douglas has read. We, in Ontario, fortunately haven't to deal with this question. Years ago, whether Professor Seligman was responsible for it or not, the Ontario Department of

Mines adopted the theory that the tax should be on the "flow" and did not attempt any dealing with the "fund." When I say that I do not know whether Professor Seligman is responsible or not I mean this, that while I do not think our legislators have received a great deal of enlightenment from the actual legislation of your states, either State or Federal, our country is certainly indebted on the whole question of mining law and mining taxation to some of the gentlemen we see here tonight. I know that they are influential on the whole continent in regard to the problems involving legislative principles. Our geologists are greatly indebted to Professor Kemp, whom I am very glad to see here, and our students of economic principles to Professor Seligman. When I was speaking to one of them, a graduate of Columbia who is consulted I might say on nearly everything dealing with certain matters by the Provincial Government, he said to me at once that you must lose no opportunity of hearing an address such as Professor Seligman will give and such, I may add, as he has given here tonight. I am not going to deal with the whole question of the theory of taxation. I will later tell you what we do in Ontario, because it is very simple.

Sometime ago, the Dominion decided that they would attempt to codify the mining laws and regulations because, while in Ontario the Province owns the land and the minerals, there are provinces where there are great deposits of minerals, as some of the mining engineers here know, which do not own the minerals. The reason for that situation is this—our Confederation consisted originally of only four provinces. It was extended by the purchase by the Dominion of the great Hudson Bay claims and the territories in which they had dominion, and the consequence was that in these provinces, now known to contain great deposits of minerals, the resources, the title to the minerals situate in them, became vested in the Dominion, which hasn't yet parted with them. There is an agitation now that the mineral resources should be transferred by the Federal authorities to the various provinces, such as Manitoba, Alberta and so on. The case of British Columbia is, of course, quite different. British Columbia joined Canada by agreement and owned the minerals, and has always owned them—owned them before federation and did not part with them when the province came into the Dominion.

When it was sought to deal with all these matters, the Canadian Mining Institute urged the Government that they should endeavor to obtain a system or code of mining law, including taxation, applicable to the territories controlled by the



Dominion, and I had the honor of being asked to draft that law and I want to say at this point how indebted our country was in general, and myself in particular, to many of the leading men here. I won't mention any who are living, but I will mention with great gratitude the late Dr. James Douglas and Dr. Raymond, who spared no trouble in order to give me the benefit of their experience, which as you all know was very wide indeed. I want to lose no opportunity to express my personal appreciation of the great trouble they took. Dr. Douglas of course was a Canadian; Dr. Raymond was not; but both of them were very anxious to do anything they possibly could.

In case many of you are interested in the subsequent developments, I may mention that the Canadian government, which decided to codify the mining law, shortly afterwards proposed an agreement of reciprocity with the United States which did not meet the approval of the electors, and the new government which succeeded them have had various difficulties of one kind or another, including the war, so that they haven't had time or haven't had an opportunity to consider the matter as a government, but they promise, as soon as some of the more pressing problems of what is called re-construction are dealt with, that they will endeavor to deal with the subject. And, I think that every one here—because you are all taking part in our development more or less—will be interested in the form our Dominion mining laws will ultimately take.

The draft I prepared I might say was approved by the Canadian Mining Institute and of course is being considered in view of subsequent developments, and the whole matter will, I am sure, be shortly dealt with in the form of legislative enactment. The theory of the Canadian Mining Institute at that time was that the Dominion government will enact what we call a model mining law, in the hope that its provisions would, not as matter of compulsion—because the provinces which own the minerals have exclusive jurisdiction over such minerals quite as much as your states have—but by reason of the success of the code in dealing with the minerals under the Dominion's jurisdiction, ultimately be adopted in the same form by British Columbia, Ontario and the other provinces in which mining operations are carried on in an extensive way.

And, as some of you know, there is to be a discussion of the whole question of a uniform mining law at Montreal, at a meeting of the Canadian Mining Institute, early next month and I would take the liberty, although only an humble member of the Institute, to extend to you a very cordial invitation to be

present there, as many of you as can, because the discussion will be well worth while. Some of you have already—some mining engineers from this city—promised to lead in some of the discussions, and mining law will be one of the questions to be discussed, including taxation.

Now I must answer the question of the Chairman in regard to what we do in Ontario. There is no attempt to value a mine at all. We take the produce of the mine and from that make certain deductions. We did not attempt to estimate the net profits, because the theory at that time was if you taxed net profits as such there would be none to tax and we did not tax the gross profits. The law provides a fixing of the mining tax by a mine assessor whose decisions are subject to appeal, on income arbitrarily estimated—not allowing for any depletion but allowing for depreciation of machinery and for every other disbursement, including wages and explosives, and all that sort of thing. On the result of this, that is the income less these expenditures, at least on the proceeds less these allowances, there is an annual tax of 3 per cent. except in two special cases, where the tax is on a larger scale and based on different principles, and which I shall not discuss.

Our Constitution is not so rigid as yours. The Ontario Legislature saw fit, in view of the erroneous supposition at that time that Ontario had a monopoly of nickel ore, to treat the nickel companies somewhat differently. They taxed ultimate profits, or rather proceeds, allowing certain deductions which I need not detail. In this case, there is a higher percentage than in the case of the ordinary mines—constituting for the nickel mines a special tax. Such special taxation is not likely to be extended and was made under very peculiar conditions. The general taxation is, and I think those who have had experience with it will agree, quite simple. There is no complication in the administration of it at all. I do not know of a single appeal from the Mining Assessor, although an appeal is provided by law. His adjustments have been considered satisfactory and the general law has worked very satisfactorily.

I thank you for the opportunity of being here and listening to the very excellent addresses of your three speakers. They are names that are well known with us and it is indeed a very great pleasure to be with you, for which I am indebted to Mr. Huntoon, who told me of your meeting and said I would enjoy being here, which I certainly have done. I thank you very cordially. (Applause.)

**Mr. Channing.**—Is there any further discussion of the subject?

**Mr. Tower.**—Mr. Chairman, I have a very great amount of respect for the speakers but I think it is pretty hard for some of us to be expected to carry away with us all of the fine points that have been brought out this evening. Time is pretty short, and I would like to inquire if it would not be possible to have these addresses submitted to us in print so that we all may have the full benefit of them before March 15, the date on which we must send in our returns.

**Mr. Huntoon.**—Mr. Chairman, in order to get this in print before March 15 it will be necessary to issue a supplementary bulletin. If we could have the stenographer's reports on Monday, I think that, in all probability, about three days will be required to get copies of these reports to the speakers of the evening and get them back to the office. Then it will have to go to the printer and it will take about eight days more before we can possibly mail it from the office. If it is the wish to turn out a supplementary bulletin, it is possible to do it. It will be about the 11th or 12th of March before it can be mailed. If the Canadian Mining Institute should desire a stenographer's copy of the minutes of the meeting there will be no trouble at all to send a copy to Mr. Clark.

I see no reason at all why we should not get the minutes of a meeting like this out as a special bulletin; there would be but little extra cost. It is an important meeting, and an important subject. I think it should be published quickly.

**The Chairman.**—Well, I think a motion would be in order that the New York Section should recommend to the Council the desirability of issuing the report of this meeting in a supplementary bulletin as early as possible. I would be willing to entertain a motion to that effect. (**Motion was made and carried.**)

A vote of thanks and appreciation to the speakers of the evening was thereupon adopted.

**Mr. Fernald.**—May I just make one suggestion about March 15? I think there has been a great deal of unnecessary disturbance as to what the Treasury Department is expecting on March 15. A good many people think that the Treasury Department is counting on the different companies making their returns by that date. But while its regulations do not allow of any general extension, I think that this is only for the sake of protection so as not to give up any rights which it may have in that regard.



What they want on that day is the money and it only expects to receive tentative tax returns. The form you will have to make out will probably have a letter attached containing directions calling for an estimated amount only of the tax, without requiring the exact amount and without expecting it to be accurate. Then there will be a further allowance of 45 days in which to make up a return—because the Department does recognize that it is absolutely impossible for corporations to obtain and digest these regulations in about a week's time so as to make an intelligent return by March 15.

**The Chairman.**—Yes, I can confirm the statement of Mr. Fernald. I know of that because the company in which I am interested was told not to worry, as sixty days more in which to fill out our blanks would be allowed. If there is no further discussion, a motion to adjourn will be in order.

The meeting adjourned at 11 p. m.

LOUIS D. HUNTOON,  
*Secretary.*

## COUNCIL.

### Meeting of February 3, 1919.

At the call of the President, a meeting of the Council was held at the Columbia University Club, New York, on Monday, February 3, 1919, at 4 p. m.

Mr. Knox, the President, presided; and other members present were: Messrs. Dorr, Huntoon, Ingalls, Kirby and Sharpless. The Assistant Secretary also attended.

The minutes of the meetings of November 4, January 2 and January 6, were approved as previously submitted to the Councilors.

**Councillors.**—The resignation of W. H. Aldridge, as Councillor to represent Districts 1-2-3-4, was accepted, as was also the resignation of J. E. Spurr, elected to represent District 5.

By a unanimous vote, W. Lindgren was elected to the Council to fill the vacancy caused by the resignation of Mr. Aldridge, and R. A. F. Penrose, Jr., was unanimously elected Councillor, vice Mr. Spurr, resigned.

**Executive Committee.**—Messrs. Ingalls and Penrose were elected members of the Executive Committee for the year 1919; the three officers becoming ex-officio members of the committee.

**Gold Medal for 1919.**—Pursuant to instructions from the Council, the Secretary cabled Mr. E. Gybbon Spilsbury requesting him to notify Mr. Charles Eugène Schneider that the Gold Medal for 1919 would be awarded to him at the Annual Meeting of the Society, January 14, 1919.

The Secretary reported for Mr. Spilsbury that Mr. Schneider had been informally notified of the award, and that at a farewell banquet given to the Engineering Congress in Paris, at which Mr. Millerand, Minister of Public Works, had presided, Mr. Spilsbury had made the following public announcement in French:

**Mr. President and Gentlemen:**

It is with hesitation that I express myself in French, and I hope that you will have the indulgence to pardon the numerous errors which I will doubtless make.

At home with us, even before the war, and with all the more reason during the gigantic conflict which you have just terminated so gloriously, we were amazed at the surprising precision of your famous "75s," by the quantity of them which you were able to produce, and by the abundance of your munitions in general. It is your cannon and your ammunition which made it possible for us to resist so completely the attacks of the Boches and to push them back beyond the Meuse.

It is manifest that, in particular, the great Creusot company, in order to attain this enormous output of materiel, could have succeeded only because it was guided and directed by a giant mind, by a man of the greatest ability in affairs, learned in science and in metallurgy, and above all a Frenchman and a patriot. For nearly a century, the name of Schneider has been known as representing all that is best, first, in the metallurgy of iron and, later, in that of steel, and all that is most noble in business integrity. Gentlemen, it is not only in France that the Schneider dynasty is regarded as representing the summit of the royalty of steel. With us, the name of Schneider is placed in the same rank as those of Bessemer, Martin and our famous John Fritz, the dean of our iron metallurgical industry.

Gentlemen and esteemed colleagues, I have the great pleasure of making known to you that the Mining and Metallurgical Society of America has delegated to me the mission of announcing to you that the Gold Medal of that Society, for the year 1919, has been awarded to Mr. Charles Eugène Schneider, in recognition of his many eminent services in the advancement of science and in the perfecting of metallurgical processes.

There have been only four recipients of this medal—the first having been awarded to Mr. Hoover for his achievements in mining, before that time, however, when the miner became of major importance in the distribution of food.

The Mining and Metallurgical Society would consider itself indeed happy if Mr. Schneider could go to the United States to formally receive the Gold Medal which has been awarded to him. Otherwise, a special commission will come to present it to him.

It was further reported in behalf of Mr. Spilsbury that Mr. Schneider had agreed to come to this country in November to receive the medal in person.

The Secretary then read the following translation of a cablegram received from Mr. Schneider:

I shall be grateful to you if you will transmit to the President, as also to the members, of your Society, all my thanks for the award of the Gold Medal of which I have been informed by Mr. Spilsbury. I shall be happy if circumstances permit me to go to the United States to personally receive this medal, of which I know and appreciate the full importance.

**Program of the Society for 1919.**—Supplementing his memorandum of January 28 to the Councillors, the President gave in outline what he had in mind relative to the future activities of the Society, and invited discussion. Copy of memorandum follows:

At the Council meeting called for 3rd February it is proposed to discuss the matter of a systematic programme for the current year. By common consent the subject chosen is Reorganization of the Mineral Industry but it remains so to organize the programme that the widest possible field may be covered with most effect. To this end it is suggested that all sources of latent energy within the Society be tapped, that an effort be made to revivify the inactive sections, that the formation of new sections and even minor groups of members be encouraged.

To promote such gatherings it will be necessary to convince them of the possibilities of usefulness by offering them a share in the labors of the Society so that each may contribute toward the final result.

Should the Council adopt this suggestion it would seem essential that the following questions be promptly decided:

1. What is the field that the Society can and should cover this year?
2. What subjects should be allotted to
  - a. Sections.
  - b. Groups.
  - c. Special Committees.
3. Can these questions be most promptly and effectively covered by
  - a. The Council.
  - b. The Executive Committee.
  - c. A Special Committee.

Your consideration of this matter in advance is earnestly desired in order that the Council may take some definite action on Monday next.

The subject matter of this communication was discussed at length and many suggestions were offered by the Councillors present as to the scope of the contemplated programme. Some of these suggestions were: Professional Training; Survey of the Mineral Industry, with especial reference to minor minerals; Labor Situation and Education of Labor; Re-employment of Engineers now in Service; Special Training of Officers. Finally, a motion was made, seconded and unanimously carried:



"That the programme of 1919 be referred to the Executive Committee with power."

The meeting adjourned at 6:15 p. m.

LOUIS D. HUNTOON,

*Secretary.*

## EXECUTIVE COMMITTEE.

Meeting of February 13, 1919.

At the call of the President, a meeting of the Executive Committee was held at the Columbia University Club, New York, on February 13, 1919, at 4 p. m.

Mr. Knox, the President, presided. The members present were Messrs. Sharpless, Ingalls, Penrose and Huntoon. The Assistant Secretary also attended.

The meeting was called to consider the matter of systematizing a program for the Society for the year 1919 and of taking the necessary action thereon. The suggestions of the President submitted to the Executive Committee under date of February 7 were discussed but definite action was deferred until the next meeting. Copy of the President's communication follows:

To the Members of the Executive Committee:

Dear Sirs,

A meeting of the Executive Committee is called on Thursday, the 13th instant, at 4 p. m., at the Columbia University Club, 4 West 43rd Street.

By resolution of the Council on February 3rd the matter of systematizing the programme and taking the necessary action thereon was referred to the Executive Committee and it is proposed to discuss this question at the next meeting.

It is requested that each member of the Committee draw up in advance a schedule covering the whole field of reorganization of the mineral industry from which he can check off those subjects appropriate to discussion by the Society. By having several such schedules to compare, the deliberations at the meeting will be much simplified and it may be possible to reach definite conclusions at a single session.

I enclose a copy of a schedule drawn up last year which is imperfect and incomplete and is only offered as a first approximation.

Yours faithfully,

H. H. KNOX.

7th February, 1919.

RECONSTRUCTION OF THE MINERAL INDUSTRY.

ELEMENTS  
ENTERING INTO CONSIDERATION.

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- I. Demand and Supply:
  - 1. Immediate.
  - 2. Future.
- II. Costs:
  - 1. Material.
  - 2. Labor.
    - a. Quantity.
    - b. Wages.
    - c. Principles of Compensation.
    - d. Efficiency.
    - e. Relations between Employer and Employed.
  - 3. Taxation.
- III. Prices:
  - 1. Freights.
    - a. Ocean.
    - b. Land.
  - 2. Competition.
    - a. Foreign.
    - b. Domestic.
- IV. Government Control:
  - 1. Tariffs.
  - 2. Other Legislation.
  - 3. Foreign Relations.
    - a. Personal Protection.
    - b. Protection of Capital.
- V. Education:
  - 1. Practical.
  - 2. Technical.
  - 3. Military.
  - 4. Postgraduate.
- VI. Research:
  - 1. Governmental.
  - 2. Co-operative.

The Assistant Secretary read letters received from Messrs. P. A. Robbins and W. F. Staunton, relating respectively to "Demobilization and Industrial Conscription" and to efficiency of labor. The Assistant Secretary was instructed to write Messrs. Robbins and Staunton, advising them that their communications would be placed in the hands of the special committees having these subjects in charge.

The meeting adjourned.

LOUIS D. HUNTOON,  
*Secretary.*

**Meeting of February 18, 1919.**

At the call of the President a meeting of the Executive Committee was held at Columbia University Club, New York, on Tuesday, February 18, 1919, at 3:30 p. m.

Mr. Knox, the President, presided. Other members present were Messrs. Sharpless, Ingalls, and Huntoon. The Assistant Secretary, Mr. Sturgis, also attended.

The minutes of the meeting held on February 13, having been submitted to the members of the Executive Committee, and no suggested changes having been received, were approved.

This meeting was called to give further consideration to the matter of a program for the year 1919.

Written suggestions were submitted to the President by Messrs. Ingalls and Huntoon; Messrs. Knox, Sharpless, and Sturgis made verbal reports.

The Secretary called the President's attention to the program as outlined in the BULLETIN of December 31, 1918, page 401. After thorough discussion the following motion was made, seconded and carried:

"That an amplification of the program, as outlined in BULLETIN No. 127, December 31, 1918, page 401, be carried into effect."

The subject of research, governmental and co-operative, was then discussed, followed by a motion duly made, seconded and carried:

"That a committee, to be known as the 'Research Committee of the M. and M. S. of A.', consisting of three members of the Society, be created."

A further discussion followed as to the personnel of this committee and the official standing of engineer-appointees, not members of the Society.

The subjects of labor and education, as outlined in the President's communication, under date of February 7, 1919, to the Executive Committee were discussed. It was the sense of the meeting that these subjects should be included in the program.

The subject "Reemployment of Engineers," and the advisability of appointing a special committee to assist in this work, was discussed. It was the sense of the meeting that the notices, giving the professional records of engineers desiring situations, now being sent to the members, is all that the Society can do.

The meeting adjourned at 5:30 p. m.

LOUIS D. HUNTOON,  
*Secretary.*



## MEMBERS ELECTED IN FEBRUARY.

|                       |                                                                         |
|-----------------------|-------------------------------------------------------------------------|
| Boise, Charles W..... | Room 1100, 42 Broadway, New York<br>Mining Engineer.                    |
| Rose, Charles A.....  | 120 Broadway, New York<br>Metallurgical Engineer, Chile Exploration Co. |

## CHANGES OF ADDRESS.

|                                                                   |                                          |
|-------------------------------------------------------------------|------------------------------------------|
| Arnold, Ralph.....                                                | 925 Union Oil Bldg., Los Angeles, Cal.   |
| Austin, L. S.....                                                 | 630 So. Alvarado St., Los Angeles, Cal.  |
| Bradshaw, Frederick.....                                          | 917 Hobart Bldg., San Francisco, Cal.    |
| Church, J. A., Jr.....                                            | 25 Broad St., New York                   |
| Conner, Eli T.....                                                | 434 Wyoming Ave., Scranton, Pa.          |
| Gammel, R. C.....                                                 | Deseret Bank Bldg., Salt Lake City, Utah |
| Hoover, Herbert C.....                                            | Stanford University, Cal.                |
| Janeway, J. H.....                                                | 160 Front St., New York                  |
| Knox, Newton B.....                                               | Minas de Phoenicia, Noya, Coruna, Spain  |
| Linton, Robert.....                                               | 120 Broadway, New York                   |
| Polhemus, J. H.....                                               | 160 Front St., New York                  |
| Shaler, Millard K.....                                            | 5, Montague du Parc, Brussels, Belgium   |
| Sinn, Francis P.....                                              | 160 Front St., New York                  |
| Smith, Wm. Allen.....                                             | 22 Paradise Rd., Northampton, Mass.      |
| Spaulding, Morril B.....                                          | 215 Poplar Ave., Wayne, Pa.              |
| Stone, George C.....                                              | 160 Front St., New York                  |
| Stout, H. H.....                                                  | Copper Queen Branch, Douglas, Ariz.      |
| Van Mater, J. A.....                                              | 160 Front St., New York                  |
| Van Wagenen, Hugh R....                                           | Canada Copper Corp., Allenby, B. C.      |
| Wayland, R. G.....                                                | Homestake Mining Co., Lead, So. Dak.     |
| White, Rush J.....                                                | Shoshone Bldg., Wallace, Idaho           |
| Winchell, H. V., 1212 First Nat.-Soo Line Bldg., Min'polis, Minn. |                                          |
| Wright, Louis A.....                                              | 61 Broadway, New York                    |
| Yeatman, Pope.....                                                | Room 708, 111 Broadway, New York         |

## PERSONALS.

Lawrence Addicks and A. F. Keene are mentioned in an article appearing in the *Engineering and Mining Journal* for February 8 entitled "Operations of the Burma Mines, Ltd." Note has before been made of Mr. Addicks' connection with this company as consulting engineer but it seems that Mr. Keene has a like position.

W. H. Aldridge has been elected president of the Texas Gulf Sulphur Co., with mines in Matagorda Co., Texas.

Howland Bancroft was in San Francisco during the latter part of January.

F. W. Bradley visited the plant of the Bunker Hill & Sullivan Co. at Kellogg, Idaho, in February. It is of this company that Mr. Bradley is president and Stanly A. Easton, manager.

Albert Burch, F. W. Bradley, W. J. Loring and G. W. Metcalfe were elected directors of the newly organized California Chapter of the American Mining Congress on January 15. H. Foster Bain, George W. Starr and Bulkeley Wells, president of the A. M. C., were also present at the meeting, the first named attending as representative of the U. S. Bureau of Mines.

George E. Collins has been elected treasurer of the Colorado Metal Mining Association.

Walter Douglas, as a member of the Copper Export Association, is a member also of the committee appointed to investigate the copper situation in Europe. The committee sailed late in January.

S. S. Fowler is one of a committee appointed to examine into the rates charged by the Consolidated Mining and Smelting Co. of Canada. This committee is semi-official.

D. A. Herron, general manager of the Tomboy Gold Mines Co., Ltd., is about to install an oil flotation plant at his company's property. R. M. Raymond was consulted in this particular matter.

J. P. Hutchins is reported to have left New York in the middle of February for Southern Russia.

W. R. Ingalls, Secretary-Treasurer of the Association of the 27th Engineers, has made his financial report as of December 31, 1918. The Comfort Fund showed a balance of more than \$7,000 at that time.

Robert Linton has become president of the North Butte Mining Co. of which he had been vice-president and managing director. Mr. Linton is to have a New York address at 120 Broadway.

D. A. Lyon is a co-author with Oliver C. Ralston of "Innovations in the Metallurgy of Lead" which has been issued by the U. S. Bureau of Mines in bulletin form.

Edwin Letts Oliver and Bulkeley Wells are directors of the Gold Point Consolidated Mines, Inc., of Nevada Co., California.

Richard A. Parker has become a director of the mining bureau of the Denver Civic and Commercial Association.

R. A. F. Penrose, Jr., has sent the Secretary a copy of his monograph on "Radium and Uranium." It bears the imprint of the University of the State of New York, and is an advance printing.

R. M. Raymond is the author of "Standardization of Mine Cars in Metal Mines" which appears in the *Engineering and Mining Journal* for February 1 and which receives editorial comment.

M. L. Requa's achievements as chief of the Oil Division of the Fuel Administration are set forth in the *Mining and Oil Bulletin*, of Los Angeles, for the month of January.

George S. Rice is chairman, and F. C. Cottrell and Frank H. Probert are members, of a committee instituted by the U. S. Bureau of Mines to report upon the methods adopted in the rehabilitation of French mines. It is understood that this committee has been in France since before the middle of February.

F. F. Sharpless, in a communication to the *Engineering and Mining Journal*, adopting as his thesis the address of J. Parke Channing at the Atlantic City Reconstruction Conference, emphasizes the need of reciprocity on the part of labor to meet new industrial conditions.

E. Gybbon Spilsbury, who represented the A. I. M. E. at the Engineering Congress in Paris, arrived in this country on January 28.

A. P. Watt is reported to have opened an office in Boston. His New York headquarters are still retained however.

R. G. Wayland writes from Camp Humphreys under date of February 9 that he has accepted a position with the Homestake Mining Co., at Lead, So. Dak. Mr. Wayland has held a lieutenant's commission, but expected his discharge on or about February 15.

Bulkeley Wells, in reply to an inquiry, writes to the Secretary that, although not commissioned by the Federal Government, he was instrumental in raising a regiment of cavalry for the Colorado National Guard, to which he was assigned as colonel. This regiment was later, in the summer of 1917, accepted by the War Department and became a part of the 157th Infantry which saw service in France.

Harry J. Wolf writes on the "Commercial Possibilities of Oil Shale" for the February 1 issue of the *Engineering and Mining Journal*. Professor Wolf has, by the way, become a consulting engineer of the U. S. Bureau of Mines.



**MEMBERS OF THE SOCIETY WHO HAVE BEEN  
CALLED INTO THE SERVICE OF THE U. S.  
GOVERNMENT AND THE ALLIED ARMIES.**

Lawrence Addicks.....Member, U. S. Naval Consulting Board  
 Ralph Arnold.....Member, Board of Tax Reviewers  
 Edwin S. Berry.....Capt., 27th Engineers  
 Reginald W. Brock.....Major of Canadian forces  
 Alfred H. Brooks.....Lt. Col., Engineer Corps, A. E. F.  
 Gelasio Caetani.....Capt., 1st Reg. of Engineers, Italian Army  
 M. F. Chase.....Dir. Explosives Division, War Ind. Board  
 C. R. Claghorn.....Lt., U. S. Naval Reserve Force  
 J. Morgan Clements....Bur., Foreign and Domestic Commerce  
 Welton J. Crook.....Officers' Training Camp  
 Benedict Crowell....Major, Eng. Corps; Asst. Secretary of War  
 W. B. Devereux, Jr.....Capt., Aviation Sec., Signal Corps  
 J. S. Douglas..Maj. and Dir. Warehouses, American Red Cross  
 Francis Drake.....British Aircraft Production Department  
 A. S. Dwight.....Major, 11th Engineers, A. E. F.  
 W. L. Honnold.....Am. Dir., Com. for Relief in Belgium  
 Herbert C. Hoover.....U. S. Food Administrator  
 D. C. Jackling.....Dir., U. S. Explosives Plants  
 Donald M. Liddell.....Capt., Aviation Sec., Signal Corps  
 Halstead Lindsley.....Major, Ordnance Corps  
 C. O. Lindberg.....Min. Engr., War Minerals Investigation  
 J. F. McClelland.....Chief, Prod. Eng., Bur. Aircraft Prod.  
 Charles W. McMeekin.....Major, General Staff  
 C. H. Macnutt.....Lt. of Engineers in Canadian forces  
 B. Magnus.....Capt., Engineer Corps  
 W. W. Mein.....Assistant Secretary of Agriculture  
 J. W. Mercer.....American Red Cross  
 C. W. Merrill....Div. of Chemicals, U. S. Food Administration  
 H. G. Moulton.....Engineer, War Industries Board  
 Seeley W. Mudd...Col. and Asst. Dir., U. S. Explosives Plants  
 O. B. Perry.....Lt. Col., 27th Engineers  
 Joseph Hyde Pratt.....Col., 105th Engineers, A. E. F.  
 A. L. Queneau.....Officer Interpreter, French Army  
 M. L. Requa.....Chief of Oil Div., U. S. Fuel Administration

## MINING AND METALLURGICAL SOCIETY OF AMERICA

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Edgar Rickard.....U. S. Food Administration  
A. P. Rogers.....Materials Dept., Signal Corps  
W. L. Saunders.....Chairman, U. S. Naval Consulting Board  
Millard K. Shaler.....Hon. Sec., Com. for Relief in Belgium  
J. E. Spurr.....U. S. Shipping Board  
H. H. Stout.....Lt. Col., Ordnance Corps  
S. A. Taylor.....Tech. Advisor, U. S. Fuel Administration  
S. C. Thomson.....War Export Board  
Arthur L. Walker.....Con. Met. to Chief of Ordnance, U. S. A.  
William Young Westervelt.Chairman, War Minerals Committee

### DIED IN THE SERVICE OF THEIR COUNTRY.

William Hague.....January 1, 1918  
J. D. Irving.....July 20, 1918

# Mining and Metallurgical Society *of America*



Bulletin Number One Hundred Thirty  
March 31, 1919  
Vol. XII, No. 3

Published at the Office of the Secretary  
115 Broadway, New York



## OFFICERS FOR 1919

*President*, H. H. KNOX, 17 Madison Ave., New York.  
*Vice-President*, F. F. SHARPLESS, 17 Madison Ave., New York.  
*Secretary-Treasurer*, LOUIS D. HUNTOON, 115 Broadway, New York.  
*Executive Committee*, MESSRS. H. H. KNOX, LOUIS D. HUNTOON, W. R. INGALLS, R. A. F. PENROSE, JR., F. F. SHARPLESS.

## COUNCIL

At large, ex-officio,  
H. H. Knox, New York.....Retires January, 1920  
F. F. Sharpless, New York.....Retires January, 1920  
Louis D. Huntoon, New York.....Retires January, 1920

Districts 1-2-3-4, New York, New England, and Eastern Canada.  
W. R. Ingalls, New York.....Retires January, 1922  
J. V. N. Dorr, New York.....Retires January, 1921  
Pope Yeatman, New York.....Retires January, 1921  
W. Lindgren, Cambridge, Mass.....Retires January, 1920

District 5—Pennsylvania.  
R. A. F. Penrose, Jr., Philadelphia.....Retires January, 1920

District 6—Ohio, West Virginia, Maryland, Virginia, North Carolina, District of Columbia, and New Jersey.  
R. M. Catlin, Franklin. N. J.....Retires January, 1920

District 7—Minnesota, Wisconsin, Michigan, Iowa, Missouri, Arkansas, and Kansas.  
E. B. Kirby, St. Louis, Mo.....Retires January, 1920

District 8—Colorado, Utah, and South Dakota.  
R. C. Gemmell, Salt Lake City, Utah.....Retires January, 1921

Districts 9-10—Northern California, Nevada, and Alaska.  
Albert Burch, San Francisco, Calif.....Retires January, 1920  
F. W. Bradley, San Francisco, Calif.....Retires January, 1921

District 11—Southern California, Arizona and Texas.  
Ralph Arnold, Los Angeles, Calif.....Retires January, 1922

District 12—Washington, Idaho, Oregon, Montana, and Western Canada.  
C. W. Goodale, Butte, Mont.....Retires January, 1922

## OFFICERS OF SECTIONS

| SAN FRANCISCO       | NEW YORK              | PHILADELPHIA     |
|---------------------|-----------------------|------------------|
| Frank H. Probert,   | S. H. Ball,           | R. H. Sanders,   |
| <i>Chairman.</i>    | <i>Chairman.</i>      | <i>Chairman.</i> |
| Edwin Letts Oliver, | J. V. N. Dorr,        |                  |
| <i>Sec.-Treas.</i>  | <i>Vice-Chairman.</i> |                  |
|                     | F. F. Sharpless,      |                  |
|                     | <i>Sec.-Treas.</i>    |                  |

DOUGLAS, ARMITAGE & McCANN, New York, Counsel for the Society.

# Mining and Metallurgical Society of America

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Vol. XII, No. 3

March 31, 1919

Bul. 130

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## ANNOUNCEMENTS.

**Meeting of the Society.**—The proposed amendments to the by-laws having been presented for consideration at the annual meeting of the Society, having received the endorsement of the Council, and copy of them having been sent to all members through the medium of the BULLETIN, in further conformity with the constitution a second meeting of the Society must be held to again give attention to these proposed amendments.

The President has therefore called a special meeting of the Society for the consideration of the proposed amendments for Thursday, May 1, 1919, at 5 p. m. The meeting will take place at the Columbia University Club, 4 West 43d St., New York. Formal notices will be sent to all the members thirty days in advance of the date set.

**New York Section.**—Mr. F. F. Sharpless, Secretary of the New York Section, announces that the next meeting of the Section will take place at the Columbia University Club, on Thursday, April 3, at 8 p. m., to be preceded by the customary dinner at 7 p. m.

The notice further states that "this meeting will inaugurate the Society's discussion of Labor and the Mining Industry," and that the principal address will be made by Mr. Meyer Bloomfield, whose subject will be "The Labor Situation in Great Britain and America."

**Council.**—At a meeting of the Executive Committee of the Council, held on February 27, the principal business was the further consideration of the "Reconstruction" program. The minutes of this meeting are reported in this number of the BULLETIN.

The President, H. H. Knox, has called a meeting of the Council for April 3, to immediately precede the New York Section meeting scheduled for that evening.

**Reconstruction Program.**—As will be noted by a reading of the proceedings of the Council, and its Executive Committee, as printed in the BULLETIN, considerable progress has been made under the "Reconstruction" program initiated by the Council for the

Society. A schedule of subjects has in a general way been adopted and the personnel of committees to undertake the consideration of these subjects has been to some extent determined. For instance, it may be announced that W. R. Ingalls has accepted appointment to the chairmanship of the Committee on Economics and G. D. Van Arsdale that of the Commission on Research of the M. and M. S. A.

**Bound Volumes.**—Members are urged to act promptly in placing orders for the bound volume of the 1918 bulletins. The binder is instructed to bind only sufficient to fill the orders received by the Secretary.

## COMMUNICATIONS.

**W. F. Staunton.**—The excellent letter which follows was written by Mr. Staunton on February 5 from Los Angeles. His exposition of the vital need for a greater efficiency of labor and the means by which this may be attained should prove of the deepest interest to the entire membership.

Mr. Louis D. Huntoon,  
Secy., Mining and Metallurgical Society of America,  
115 Broadway, New York, N. Y.

Dear Sir:

I wish to record the great satisfaction with which I have read Mr. Ingalls' address of January 14 last, as retiring president, on "The Economic Duties of the Engineer," and to take advantage of the suggestion made at that meeting that members contribute ideas they may have on the readjustment problems.

The common drift of thought towards many of the ideas Mr. Ingalls expressed, among those of our profession whose practical attainments have made them leaders, in position to give publicity to their views, and therefore wielders of influence, is striking and reassuring to those who, like myself, believe that the engineer must take an increasingly active part (and quickly) in the reconstruction and operation of the social machine if our country is to maintain its place in the world. Perhaps I should go further and say, if it is to avoid disaster from trying working-scale experiments which a slight knowledge of history and the fundamentals of economics should prevent.

"The Economic Duties of the Engineer" comes as a most important addition to Channing's "Man Power;" Kemp's "The Human Side of Mining Engineering;" Finlay's "Readjustment not Reconstruction;" and, to go outside of our immediate circle, Secretary Lane's "Americanization."

To this splendid array we could all add the titles of many more articles brimming with uplifting thoughts on the great problems now before the world. We listen, or read, and agree, just as we do when we go to church; but do not most of us slide gently back into our habitual grooves and leave "George" to do the rest? I think that many, perhaps most of us, do. And yet we have before us problems compared with which those involved in



going to war may prove to have been easy. There will be no flags, bands, and uniforms as stimuli, nor the exuberant appropriation of billions to accomplish results regardless of the consideration of unit costs, as compared with other countries. Economic laws, so lately suspended, will be in relentless operation. Efficiency of labor, which, owing to the prodigious market that has existed and the necessity of getting things quickly regardless of cost, has declined alarmingly with us, has, on the other hand, increased abroad; a production per man of ten times the pre-war rate having been reached in some lines, according to eminent authority. A severe jolt to our complacency of superiority seems unavoidable when normal competition returns.

What, in a practical way, are we going to do about it? What, in a word, is the solution of our problem? I believe it is education; but not that sort of thing which comes to the mind of the school-trained man when the word is used—a vision of books and apparatus—but rather a knowledge of those simple, homely, historic, economic, ethic truths that man in his painful upward progress has again and again verified by the ghastly failure of experiments which this generation seems now about to repeat. Education is the keynote of Secretary Lane's "Americanization;" but even in that masterly appeal one can wish for more emphasis on the elemental principles. The English language should be first, of course, for those ignorant of it, but after that, as between imparting the power given by the "three R's," to be exercised in absorbing poisonous misinformation from the yellow press and reckless propaganda in general, and a knowledge of how to think clearly on the problems of everyday life, I choose the latter; but there is no good reason for not having both.

My observation is that not very many even fairly enlightened people one meets can give a clear and logical explanation of capital—what it is, its origin, its benefit to all, laborers included; and why it is necessary for any material progress whether under individualism, socialism, or any other -ism. So in regard to what is possible in the long run in the payment of wages; that the market value of the things produced sets an absolute limit to them; that no legislation or strikes can change this condition, notwithstanding that an occasional professor arises to testify that the basis of minimum wages should be made by law the cost of a comfortable living, a condition we would surely all welcome, if true. But the place man is making for himself in the universe is an artificial one, and is only maintained by his successful struggle to re-direct forces tending otherwise, and it is success in this struggle and consciousness of ability to succeed that gives man's intelligence its god-like potentiality, develops his strength and supports the hope of progress. So the elementary idea should be taught that the things worth having, even those altruistic in character, are only the rewards of effort of muscle and brain and not within the power of legislatures or unions to bestow.

The conception of "freedom," too, needs clarifying. The more we hear of it lately the less there seems to be. There is none when the laws guaranteeing a man protection from violence in the pursuit of his ordinary avocations are a dead letter and when his head may be broken with impunity or approval if he fails to join a particular organization which he does not want to join for possibly very good reasons of his own. What unjust strike could succeed if unlawful violence were made impossible? The unions and collective bargaining have come to stay; their justification is their undoubted improvement in the workers' economic status. As their potentiality for good is tremendous, so it is also for harm, to the workers themselves and society in general. The result of their unrestrained development needs no prediction. Fighting the abuse of their advancing arbitrary power and

the inevitable train of needlessly repeated experimentation, by the exercise of another arbitrary power is unintelligent, and enlightenment by education in the fundamentals of economics and ethics is the only way in which these agencies can be effectively dealt with; preserving the good and eliminating the evil. It is not too much to hope that some day membership in good standing in a trade-union will be a guaranty of proficiency and integrity instead of a danger signal.

The practical wisdom (aside from any other reason) of a system of ethics should be made plain and the fact that theists of all kinds, agnostics, atheists, even pagans, and probably Germans, appreciate and in their hearts and minds really believe in the essential truth of the broad principles of morality taught by Christ, and that the most rapid development of the human race, not alone in material things but also in the average of individual well-being and happiness, is coincident with the Christian era.

I do not know how others feel, but for my part I cannot help ascribing a part at least of the unrest at the bottom of much of the present turmoil to the fading away of old religious beliefs without the substitution of other guides. With the disappearance of the blind acceptance of constituted authority, physical and moral, which we have seen everywhere, has come the dawn of an attempt to analyze the situation without the guide of historical or economic knowledge. We can imagine a new Russian thinking: "I find myself here on this planet wholly without my consent. I see others around me with far more of the things that make life pleasant, indeed the sole occupation of many seems to be to devise new means of enjoyment, while I slave along on a pittance. To be sure, they say that rules have been made permitting this condition, but I did not agree to these, and it even appears that these rules were made by people most of whom are now dead, and that they are perpetuated and revised by a small minority of those now here; the others not bothering themselves to express themselves one way or another. I decline to recognize these rules and I am going to get what I want in any way I can. The game was evidently rigged by a lot of people who happened to be here first, and I don't propose to stand for it."

Perhaps not many have formulated the proposition as raw as this, but there is little doubt of the growth of some such feeling, and nothing but education can combat it.

Fortunately the kind of education needed is elementary in the extreme, and not of a kind requiring much time or study. We can all be teachers in such a school; but in this as in other things in this world, the same old competitive system on which everything is planned is still in operation, and we have formidable competitors. Since the growth of conscious power from organization, which has come largely within the lifetime of many of us, we have been forcibly reminded that great mental ability is quite compatible with moral obliquity, and that such mental ability can be hired for unworthy purposes. Many of the organizations we shall have to deal with are possessed of abundant financial means, and with their great numerical memberships can, and do, accumulate formidable sums from trifling individual payments, which sums constitute an irresistible temptation to brilliant but unscrupulous minds. Also, we have the venal yellow press, where control by one vicious mind permits feeding mental poison literally to millions. These are the worms at the root. Many people have derived their whole educations among the branches and twigs of the tree of knowledge and know nothing about the roots and trunk, at which a busy little worm may be conducting operations, the effects of which they see among the leaves, and try to combat with futile local treatment.



Mr. Finlay has the happy faculty of going to the foundation of things and building thereon structures in which one cannot help feeling confidence. His "Readjustment not Reconstruction" is a delight to one who believes in beginning at the beginning—setting up as he does a row of axioms and building his argument firmly thereon. It is something like that which the enlightened people of the world must do to steady the tottering structure of civilization. We must get down to the foundations and make them secure; patching up the cracks afterwards. Fixing foundations is pre-eminently an engineering job. It must be done by enlightened propaganda, elementary education, pounded into every crack and crevice that can be found, and, judging by the startling manifestations we are daily witnessing here, there and everywhere throughout the world, there is no time to lose.

In old times, ideas traveled slowly but today they are flashed to every corner of the world. That good ones can be spread quickly and that they will take effect with marvelous results is shown by looking back at Hoover's work in food conservation, where a few simple, vital facts were spread like wildfire, found ready acceptance, accomplished the apparently impossible, and prevented the loss of the war, already privately conceded by Lord Rhonda on account of the supposed inevitable failure of the food supply. Something like that can be done in back-firing against the social conflagration.

This country is full of organizations. There are clubs and societies by the thousand, ostensibly for this, that, and the other thing but most of them in eager search for a really interesting object, notwithstanding their titles. They overlap, and their members touch elbows constantly. They are mostly composed of rather enlightened people, employers of others in large and small degree, but in the aggregate enormous, their members moving about so as to increase the points of contact to a degree that would make the spreading of propaganda (if such spreading should become interesting) well nigh perfect. They constitute a possible means of combating social heresies that could hardly be improved.

At a recent meeting of the New York Section, a letter from Mr. Stone was read covering suggestions as to what subjects might be taken up calculated to assist in the necessary readjustments, and among his suggestions is "educating the workmen in economics." He says he believes "that the M. M. S. A. should devote a large part of its discussions to the ascertainment of the best means of educating men along these and similar lines." I wish to second this suggestion most heartily, and in doing so, wish to urge most earnestly upon the members that they do not wait for discussion, but begin forthwith, each of them, to preach the doctrines of social sanity as taught by history and common sense wherever they can get an audience, with an eye particularly to getting similar missionary work taken up by the membership of such clubs and societies as they belong to, so that a beginning may be made (somewhat chain-letter fashion) in furthering this most important work, the most important by far before the world today. Let discussion follow, by all means, and it is to be hoped that it will result in formulating something like a set of Mr. Finlay's axioms with a superstructure of simple but definite conclusions on the vital economic questions that can be used as propaganda in the way suggested or some better way that may develop.

Very truly yours,

W. F. STAUNTON.



**Geo. A. Laird.**—The following letter received from Mr. Laird is of special interest and deserves the careful consideration of the membership at large. The Secretary will appreciate expressions of opinion on Mr. Laird's suggestions which may be presented to the Council for action.

In this connection, the Secretary can relate an experience of his own which follows closely along the lines suggested by Mr. Laird. A few years ago he was called upon to examine a property near Hermosa, New Mexico; before leaving New York, he wired and wrote a number of engineers regarding this particular property and the district in general. He received one letter in reply which contained this statement, "the district is a frost." This letter was submitted to his client with the result that the owners of the property, and not the client, paid for the report.

The consulting engineer, due to his familiarity with mining districts and his ability in some instances to give off-hand an unfavorable opinion, is very likely to lose examination work. It has been the experience of the Secretary that clients are unwilling to pay for such information and in some cases have employed other engineers who are unfamiliar with the district which may be in question; they consider that the first engineer consulted is prejudiced, and can forecast an unfavorable report, which is not desired.

The Secretary offers no opinion as to the feasibility or advisability of carrying out Mr. Laird's suggestions, and most earnestly invites discussion on the subject.

Ray, Arizona, March 17th, 1919.

To the Secretary,

Mining and Metallurgical Society of America,  
115 Broadway, New York.

Dear Sir:

With the gradual disappearance of the prospector, it is apparent that some steps must be taken to encourage prospecting or create a campaign of reliable publicity for districts which may be worthy of consideration but are not properly brought to the attention of the mining public.

The larger companies, with a force of field engineers, are frequently offered prospects which do not come up to their requirements, but might be considered by smaller companies or by individuals.

The field engineers are, by ethics or by terms of contract, prohibited from discussing their work in a given district, and idleness results, as the property has been "turned down."

The "Personal Paragraphs" in the technical bulletins and magazines frequently state that "Mr. So and So has recently made an examination in the This and That District," but the report made is confidential, and the item is of no interest to the profession other than that Mr. So and So has (presumably) received a fee.

Individually Mr. So and So has obtained some general information which he gladly divulges to his immediate friends—can divulge to anyone—which might be of great interest to the rank and file with whom he has no communication.

It is proposed that engineers, particularly the members of the Mining and Metallurgical Society of America, submit to the Secretary to be published in the BULLETIN, a short summary of their observations which are not of a confidential nature, a concrete example following:

#### FIELD OBSERVATIONS

"In February, George A. Laird visited the Old Hat Mining District, Pinal County, Arizona. The property examined, some 20 miles south of Mammoth, consists of a remnant of Devonian limestone which shows replacement deposits of lead carbonates with values in silver.

"There is but little development in the immediate vicinity, the overburden making prospecting difficult."

Or:

"The Lightning Ridge Opal fields, New South Wales, were visited. While not of a nature to encourage a company going into the field, it is of sufficient interest to warrant a day or two as a side trip."

Or:

"Mr. So and So recently paid a visit to the Bull Con District, where conditions in general do not warrant a visit excepting under specific instructions to examine and report."

This latter item cannot be considered as a direct "knock." There are dozens of districts where such a statement would hold good.

Many times the principal obstacle to prospect development is the prospector himself, but equally as often it is the unfitness of the property to meet the special requirements of the party requiring the engineer's report.

The general scheme proposed is therefor to publish in addition to the "Personals," an observation column, which implies a fee and definitely states something in which engineers not in on the fee may profit by.

These observations can be so arranged in the BULLETIN as to be readily clipped and filed so as to be available for reference when needed.

Very truly yours,

GEO. A. LAIRD.

### OTHER SOCIETIES.

#### ENGINEERING COUNCIL.

With this month, the Engineering Council issues a revised leaflet of general information. It announces the addition of one member society and the creation of many more committees, including those of National Service, Americanization and Reconstruction. Also, it appears that correspondents have been appointed throughout the country in principal engineering centers.

Furthermore, the leaflet of 1919 differs from that of last year in that it carries the address of the Washington office which was authorized by the Engineering Council and opened in late autumn

of 1918, as announced in the January BULLETIN. Mr. M. O. Leighton is in charge of the Washington office as well as being chairman of the National Service Committee.

**National Service Committee.**—From this Committee under date of March 11, the Secretary has received what follows, under the subject heading "Legislative and Departmental Information Service."

Engineering Council, through its National Service Committee, is inaugurating a legislative and departmental service which is to be available to all engineers and engineering societies of the United States in all branches of the profession. There has for some time been a generally expressed desire for some engineering representation in Washington through which the engineers and the engineering opinion of the country on legislative and departmental matters could be effectively presented, and to which engineers may appeal for information and advice.

The Government has by reason of its bureaus of research and investigation, and as a result of its performance of large construction work, become a valuable source of engineering information the habitual use of which must be of benefit to the profession. In addition to the published reports which have become more or less familiar, there is in the several engineering bureaus much unpublished information available to the public on application.

Under present conditions information can be secured by engineers on direct application if they know what is available and where to address inquiries, but even in such cases, the bureau officials addressed can do little more than to forward publications in the greater part of the contents of which the inquirer usually has no interest. The facts desired can usually be gleaned from such publications but only after the expenditure of much time. It will be the purpose of the new information service, which will be under engineering direction, to give inquiring engineers just the kind and amount of information they desire, by making abstracts and compilations or by designating those parts of published reports which contain the desired information.

In addition to the foregoing service, the National Service Committee will be prepared to review legislative and departmental events and circumstances and to prepare bulletins thereon for general information. This is in response to the frequently expressed need among engineers for a more thorough understanding of the various laws passed by Congress that involve engineering considerations. It is also in response to the recent awakening among engineers at large with respect to their political privileges and responsibilities. Some sort of service is needed to assist engineers to keep abreast of political events of an engineering nature.

If the foregoing appeals to you of prospective benefit to the members of your society, it is suggested that you advise your members and extend to them a cordial invitation to make use of the service. If your society publishes a journal, the National Service Committee will be glad to make occasional contributions thereto on conditions and events at Washington that may be of interest to the particular branch of engineering which your journal covers. If, therefore, you will forward to this office the name and post office address of the editor of said journal, suitable arrangements for the service will be made.

M. O. LEIGHTON,  
*Chairman,*  
 NATIONAL SERVICE COMMITTEE.



The National Service Committee has charge also of the arrangements for a Conference of Engineering Societies which is to be held in Chicago, April 23, 24 and 25, to take action on the resolution adopted by the Engineering Council, on February 20, advocating the creation of a Federal Department of Public Works.

### AMERICAN ZINC INSTITUTE.

With the publication of the *A. Z. I. Bulletin* for March (Vol. II, Nos. 1, 2 and 3) it is announced that a monthly issue will appear hereafter. The number here in question consists of 19 pages and is full of interesting information, arranged and enumerated in an admirable manner.

It appears that an executive committee has been created to carry on the routine business of the A. Z. I., but whose actions shall be validated by the board of directors. The annual meeting of the A. Z. I. will take place in St. Louis on May 12.

## COUNCIL.

### EXECUTIVE COMMITTEE.

Meeting of February 27, 1919.

A meeting of the Executive Committee, called by the President, was held at the Columbia University Club, on February 27, 1919, just prior to a meeting of the New York Section.

The meeting was called to order at 5:40 p. m.; in addition to Mr. Knox, there were present Messrs. Huntoon, Ingalls, Penrose, Sharpless and the Assistant Secretary.

No corrections having been suggested to the minutes of the previous meeting, copies of which had been mailed to the members of the Executive Committee, they stood approved.

**Gold Medal.**—The Secretary read the translation of a letter received from Mr. Eugène Schneider, confirming his cable accepting the award of the 1919 medal. The letter follows:

42, Rue d'Anjou, Paris, 29 January, 1919.

Sir:

Informed by Mr. Spilsbury that the Gold Medal of the Mining and Metallurgical Society of America has been awarded to me for 1919, I immediately telegraphed you to request that you would tender my thanks to the President and the members of the Council of your Society.

Recognizing the full importance to be attached to this medal I highly appreciate the honour of being the recipient. This testimony from my American colleagues has particularly touched me and I shall be happy to meet them if, as I am hoping, I am able to find the time necessary, during the current year, to go to your country.

Please again convey in my behalf these expressions of my gratitude and accept for yourself, sir, the assurance of my distinguished consideration.

SCHNEIDER.

**Reconstruction Program.**—The Secretary reported that the appointees for chairmen of the mineral survey committees had been notified, viz.: Chrome, Albert Burch; Manganese, C. M. Weld; Potash, W. W. Mein; Sulphur and Pyrite, Wm. Young Westervelt; Tungsten, A. R. Ledoux. It was decided that the Secretary of the Society, rather than the chairmen of committees, should notify other appointees to these committees, after their names had been suggested by the chairmen and had been confirmed by the President.

Possible chairmen for committees on Tin, Platinum and Antimony were discussed, but no definite action was taken. With reference to Quicksilver, it was announced that Mr. Sharpless had accepted appointment as chairman.

The President reported that G. D. Van Arsdale, chairman of the Research Committee, had suggested the names of J. V. N. Dorr, John Johnston of the National Research Council, L. D. Ricketts, and Arthur L. Walker for this committee. It was further stated that the principal divisions of this subject would be Governmental and Institutional, Cooperative and Private, and that these would be respectively in charge of Johnston, Walker, Ricketts and Dorr. It having been pointed out that Messrs. Johnston and Ricketts were not members of the Society, a suggestion made by the President to overcome this difficulty was accepted in the adoption of the following motion: "That in such cases (i. e., non-member appointees) where the appointment of a commission instead of a committee seems advisable it should be done."

The President read a letter received from Mr. Channing which referred to the subject of "industrial relations" as one to which the Society might give attention. A letter from George A. Laird, relative to the indexing of field data collected by engineers so that they would be accessible to others, was also read.

Finally, the President read a form letter prepared by him for circularization among members in the principal mining centers to urge the formation of groups to give consideration to the subjects of the Reconstruction program; this proving satisfactory to the meeting it was adopted.

The meeting adjourned at 6:30 p. m.

LOUIS D. HUNTOON,  
*Secretary.*

## CHANGE OF ADDRESS.

MacNaughton, James.....Calumet, Mich.

## MEMBERS ELECTED IN MARCH.

Crane, Clinton H.....61 Broadway, New York  
President, St. Joseph Lead Co.

Keeney, Robert M.....1125 York St., Denver, Colo.  
Gen. Mgr., The Iron Mountain Alloy Co.

## PERSONALS.

S. H. Ball is the co-editor of an article in the *Engineering and Mining Journal* for February 22 entitled "Magmatic Iron Ore in Arizona."

Percy E. Barbour, according to the public press of March 3, has resigned as Deputy Superintendent of the New York State Police. Mr. Barbour has also resigned from the army and has now definitely accepted the assistant-secretaryship of the A. I. M. E.

J. L. Bruce has been appointed a member of the membership committee of the American Zinc Institute and O. M. Bilharz is to serve on the committee of statistics and economics.

J. A. Church, Jr., long metallurgical accountant for the Nichols Copper Co., is now Secretary of this same company, and will have his office at headquarters, 25 Broad Street.

H. S. Drinker, according to a recent report, has been elected a director of the Lehigh Valley Railroad.

R. C. Gemmell is quoted at length in the *Mining and Scientific Press* in an article entitled "The Position of Copper Analyzed." It seems that Mr. Gemmell's remarks first appeared in the *Salt Lake Tribune* and were called forth by the statement regarding the condition of the copper industry issued by the Government on February 4.

B. Britton Gottsberger was in New York during the latter part of March. Mr. Gottsberger, by the way, is a correspondent of the Engineering Council under the plan recently adopted for keeping in touch with centers of engineering activity.



H. C. Hoover, as had been surmised, has been made Director-General of Allied Relief under the commission at Paris. Furthermore, under order of President Wilson made public on March 2, Mr. Hoover becomes Director-General also of the American Relief Administration with full authority over the disbursement of the \$100,000,000 appropriated by the Congress for the relief of starving populations in Europe other than those of the Central Powers. Mr. Hoover, by the way, is the subject of an article in *l'Echo des Mines et de la Métallurgie*, for January 31, 1919. This article appears in part translated in the *Engineering and Mining Journal* under the title "On Reconquered Soil."

W. R. Ingalls and Pope Yeatman have been made honorary members of the American Zinc Institute. Mr. Ingalls is a member also of the committee on statistics and economics recently created by this organization.

Frederic Keffer and Oscar Lachmund are reported to have been two of some 20 delegates from Spokane to the Coast International Mining Convention held at Vancouver on March 17, 18 and 19.

J. F. Kemp, H. M. Payne, Bradley Stoughton and Horace V. Winchell were among the engineers from the United States to attend the annual meeting of the Canadian Mining Institute held on March 5, 6 and 7. Professor Kemp presented a paper on "A Uniform Mining Law for North America."

H. H. Knox, President, and F. F. Sharpless, Vice-President, of the Society, are the subjects of biographical sketches in the *Engineering and Mining Journal* for March 15. Their portraits also appear.

Newton B. Knox, whose exact whereabouts have been somewhat of a mystery for many months, is reported to be in Noya, Spain.

W. J. Loring, who is president and general manager of the Pacific Coast Gold Mines Corporation, has now acquired for this company title to the Dutch-Sweeney-App mines of Tuolumne Co., California. It is also reported that the Morgan mine in Calaveras Co. is now owned by the Carson Hill Gold Mines, Inc., of which Mr. Loring is at the head.

S. W. Mudd is another engineer whose work in Washington is evidently drawing to a close. At least, a permanent Los Angeles address has recently been announced.

O. B. Perry, Colonel of the 27th Engineers, cabled on March 4 that his regiment would sail on the S. S. "Dakotan" from St. Nazaire on that date. As is now known by all, the "Dakotan" docked at New York on March 20.

Edgar Rickard, who is Acting U. S. Food Administrator, was appointed by President Wilson on March 2 a joint-director in the United States of the American Relief Administration. He will shortly open offices at 120 Broadway, New York.

Francis P. Sinn, who as previously noted has been temporarily located in New York, now has his permanent office with the New Jersey Zinc Co. in this city and has become assistant to the vice-president of that company. It should also be noted that Mr. Sinn is a member of the American Zinc Institute committee on welfare and safety.

George Otis Smith, Director of the U. S. Geological Survey, has spoken in favor of the so-called potash bill before the Senate Committee on Mines and Mining. This bill was initiated by the Interior Department.

George W. Starr and Albert Burch have been elected governor and vice-governor, respectively, of the California chapter of the American Mining Congress.

George C. Stone is chairman and Otto Sussmann a member of the standing committee on development of industry of the American Zinc Institute. The *Bulletin* of the A. Z. I. announces that, as soon as Mr. Stone has begun his survey of European conditions of the zinc industry, his reports will be issued as fast as received.

J. B. Tyrrell contributes "Early Indian Raids on Mexico" to the March 15 issue of the *Engineering and Mining Journal*.

A. P. Watt contributes a statement to the general discussion on the "flotation process" in the *Engineering and Mining Journal* for March 8.

Walter Harvey Weed was in Montana during the month to examine the property of the Crystal Copper Co., situated in Jefferson County.

Bulkeley Wells has been made president of the newly organized Gold Point Consolidated Mines, Inc., representing the consolidation of a number of properties near Grass Valley, California. In passing, it should be noted that Mr. Wells' address, made as president of the American Mining Congress, to the California chapter is printed in part in the March 15 number of the *Engineering and Mining Journal*.

O. R. Whitaker has been retained as technical advisor to the committee which is investigating the rates charged by the Consolidated Mining & Smelting Co. As already noted in a previous issue, this is the committee of which S. S. Fowler is a member. It will be recalled that Mr. Whitaker made a survey of the metallurgical industry in 1917 for the State of Colorado, and that in 1918 he undertook similar work for the Canadian Government.

Louis A. Wright, in a communication dated January 27, announces his return to the United States from Chile about April 15. He is to have offices in this city at 61 Broadway.

Pope Yeatman, as will be remembered, was an appointee to membership on the committee created by the Secretary of the Treasury to investigate the gold situation. This committee made its report on February 11 and in it makes reference to the benefit derived from "the very complete survey of the conditions of the gold-mining industry contained in the report dated October 30, 1918, of the committee appointed by the Secretary of the Interior to study the gold situation, of which Hennen Jennings, Esq., was chairman."



**MEMBERS OF THE SOCIETY WHO HAVE BEEN  
CALLED INTO THE SERVICE OF THE U. S.  
GOVERNMENT AND THE ALLIED ARMIES.**

Lawrence Addicks.....Member, U. S. Naval Consulting Board  
 Ralph Arnold.....Member, Board of Tax Reviewers  
 Edwin S. Berry.....Capt., 27th Engineers  
 P. R. Bradley.....Federal Food Administrator, Alaska  
 Reginald W. Brock.....Major of Canadian forces  
 Alfred H. Brooks.....Lt. Col., Engineer Corps, A. E. F.  
 Gelasio Caetani.....Capt., 1st Reg. of Engineers, Italian Army  
 M. F. Chase.....Dir. Explosives Division, War Ind. Board  
 C. R. Claghorn.....Lt., U. S. Naval Reserve Force  
 J. Morgan Clements.....Bur., Foreign and Domestic Commerce  
 Benedict Crowell.....Major, Eng. Corps; Asst. Secretary of War  
 J. S. Douglas.....Maj. and Dir. Warehouses, American Red Cross  
 Francis Drake.....British Aircraft Production Department  
 A. S. Dwight.....Major, 11th Engineers, A. E. F.  
 Herbert C. Hoover.....U. S. Food Administrator  
 D. C. Jackling.....Dir., U. S. Explosives Plants  
 Donald M. Liddell.....Capt., Aviation Sec., Signal Corps  
 C. O. Lindberg.....Min. Engr., War Minerals Investigation  
 Halstead Lindsley.....Major, Ordnance Corps  
 J. F. McClelland.....Chief, Prod. Eng., Bur. Aircraft Prod.  
 Charles W. McMeekin.....Major, General Staff  
 C. H. Macnutt.....Lt. of Engineers in Canadian forces  
 B. Magnus.....Capt., Engineer Corps  
 W. W. Mein.....Assistant Secretary of Agriculture  
 J. W. Mercer.....American Red Cross  
 C. W. Merrill.....Div. of Chemicals, U. S. Food Administration  
 H. G. Moulton.....Engineer, War Industries Board  
 Seeley W. Mudd.....Col. and Asst. Dir., U. S. Explosives Plants  
 O. B. Perry.....Lt. Col., 27th Engineers  
 Joseph Hyde Pratt.....Col., 105th Engineers, A. E. F.  
 A. L. Queneau.....Officer Interpreter, French Army  
 M. L. Requa.....Chief of Oil Div., U. S. Fuel Administration  
 Edgar Rickard.....U. S. Food Administration  
 A. P. Rogers.....Materials Dept., Signal Corps

## MINING AND METALLURGICAL SOCIETY OF AMERICA

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W. L. Saunders.....Chairman, U. S. Naval Consulting Board  
Millard K. Shaler.....Hon. Sec., Com. for Relief in Belgium  
J. E. Spurr.....U. S. Shipping Board  
H. H. Stout.....Lt. Col., Ordnance Corps  
S. A. Taylor.....Tech. Advisor, U. S. Fuel Administration  
S. C. Thomson.....War Export Board  
Arthur L. Walker.....Con. Met. to Chief of Ordnance, U. S. A.  
William Young Westervelt...Chairman, War Minerals Committee

### DIED IN THE SERVICE OF THEIR COUNTRY.

William Hague.....January 1, 1918  
J. D. Irving.....July 20, 1918

# STANDING COMMITTEES

## Executive Committee

H. H. KNOX  
 LOUIS D. HUNTOON  
 W. R. INGALLS  
 R. A. F. PENROSE, JR.  
 F. F. SHARPLESS

## Gold Medal

E. GYBBON SPILSBURY, *Chairman*  
 J. E. JOHNSON, JR.  
 BRADLEY STOUGHTON

## Professional Training

ARTHUR L. WALKER, *Chairman*  
 F. W. BRADLEY  
 SIDNEY J. JENNINGS

## Mine Taxation

J. R. FINLAY, *Chairman*  
 E. T. CONNER  
 HERBERT C. HOOVER

## Standardization

C. R. CORNING, *Chairman*  
 J. PARKE CHANNING  
 GEO. C. STONE

## Welfare of Mine and Metallurgical Employees

J. PARKE CHANNING, *Chairman*  
 R. M. CATLIN  
 WM. YOUNG WESTERVELT

## PAST PRESIDENTS

|                                 |                        |
|---------------------------------|------------------------|
| HENRY S. MUNROE.....1908-1909   | JAMES F. KEMP.....1914 |
| J. PARKE CHANNING.....1910-1912 | W. R. INGALLS.....1915 |
| HENRY M. CHANCE.....1913        | J. R. FINLAY.....1916  |
| W. R. INGALLS.....1917-1918     |                        |

## FORMER SECRETARIES

|                            |                             |
|----------------------------|-----------------------------|
| J. R. FINLAY.....1908-1909 | W. R. INGALLS.....1911-1914 |
| HENRY S. MUNROE.....1910   | F. F. SHARPLESS.....1915    |
| LOUIS D. HUNTOON.....1916— |                             |

## GOLD MEDAL

|                                 |                      |
|---------------------------------|----------------------|
| 1914 { HERBERT C. HOOVER        | 1916 JAMES F. KEMP   |
| { LOU HENRY HOOVER              | 1917 E. P. MATHEWSON |
| 1915 ROBERT H. RICHARDS         | 1918 POPE YEATMAN    |
| 1919 (CHARLES) EUGÈNE SCHNEIDER |                      |





# Mining and Metallurgical Society *of America*



Bulletin Number One Hundred Thirty-one  
April 30, 1919  
Vol. XII, No. 4

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## OFFICERS FOR 1919

*President*, H. H. KNOX, 17 Madison Ave., New York.

*Vice-President*, F. F. SHARPLESS, 17 Madison Ave., New York.

*Secretary-Treasurer*, LOUIS D. HUNTOON, 115 Broadway, New York.

*Executive Committee*, MESSRS. H. H. KNOX, LOUIS D. HUNTOON, W. R. INGALLS, R. A. F. PENROSE, JR., F. F. SHARPLESS.

## COUNCIL

At large, ex-officio,

H. H. Knox, New York.....Retires January, 1920

F. F. Sharpless, New York.....Retires January, 1920

Louis D. Huntoon, New York.....Retires January, 1920

Districts 1-2-3-4, New York, New England, and Eastern Canada.

W. R. Ingalls, New York.....Retires January, 1922

J. V. N. Dorr, New York.....Retires January, 1921

Pope Yeatman, New York.....Retires January, 1921

W. Lindgren, Cambridge, Mass.....Retires January, 1920

District 5—Pennsylvania.

R. A. F. Penrose, Jr., Philadelphia.....Retires January, 1920

District 6—Ohio, West Virginia, Maryland, Virginia, North Carolina, District of Columbia, and New Jersey.

R. M. Catlin, Franklin, N. J.....Retires January, 1920

District 7—Minnesota, Wisconsin, Michigan, Iowa, Missouri, Arkansas, and Kansas.

E. B. Kirby, St. Louis, Mo.....Retires January, 1920

District 8—Colorado, Utah, and South Dakota.

R. C. Gemmell, Salt Lake City, Utah.....Retires January, 1921

Districts 9-10—Northern California, Nevada, and Alaska.

Albert Burch, San Francisco, Calif.....Retires January, 1920

F. W. Bradley, San Francisco, Calif.....Retires January, 1921

District 11—Southern California, Arizona and Texas.

Ralph Arnold, Los Angeles, Calif.....Retires January, 1922

District 12—Washington, Idaho, Oregon, Montana, and Western Canada.

C. W. Goodale, Butte, Mont.....Retires January, 1922

## OFFICERS OF SECTIONS

### SAN FRANCISCO

Frank H. Probert,

*Chairman.*

Edwin Letts Oliver,

*Sec.-Treas.*

### NEW YORK

S. H. Ball,

*Chairman.*

J. V. N. Dorr,

*Vice-Chairman.*

F. F. Sharpless,

*Sec.-Treas.*

### PHILADELPHIA

R. H. Sanders,

*Chairman.*

DOUGLAS, ARMITAGE & McCANN, New York, Counsel for the Society.



# Mining and Metallurgical Society *of* America

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Vol. XII, No. 4

April 30, 1919

Bul. 131

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## ANNOUNCEMENTS.

**Meeting of Society.**—As announced in the March BULLETIN and by formal notice sent to all the members, a special meeting of the Society will be held at the Columbia University Club, New York, on May 1, 1919, at 5:00 p. m., to give further consideration to the proposed amendments to the by-laws, which were first presented at the Annual Meeting and then published in BULLETIN 128, January, 1919.

A careful examination of these proposed amendments should be made by the members in advance of the meeting.

**New York Section.**—A total of 54 members and guests attended the dinner and meeting of the New York Section held at the Columbia University Club on Thursday, April 3, to hear an address by Mr. Meyer Bloomfield on "The Labor Situation in Great Britain and America." Mr. H. H. Knox, the President of the Society, preceded Mr. Bloomfield in order to give the meeting an outline of the Society's program with reference to the labor situation. A full report of the proceedings appears on another page of this issue.

**Council.**—The Executive Committee of the Council held a short meeting at the Columbia University Club on April 3 just prior to the meeting of the New York Section scheduled for the same date. The minutes of this meeting will be found on page 145.

**Chicago Conference.**—As noted in the March BULLETIN, a Conference of Engineering Societies is to be held in Chicago, on April 23 to 25, under the auspices of the National Service Committee of the Engineering Council. This conference has been called to take action on a resolution adopted by the Engineering Council urging the creation of a Federal Department of Public Works.

At the joint request of the Engineering Council and M. O. Leighton, Chairman of the N. S. C., the President has appointed J. Parke Channing delegate of this Society to the conference.

## MEETINGS OF SECTIONS.

### NEW YORK SECTION.

**Meeting of April 3, 1919.**

The April meeting of the New York Section took place at the Columbia University Club on the 3rd instant, with the customary informal dinner immediately preceding.

As had been announced, this meeting, as a part of the Reconstruction program, was devoted to "Labor and the Mining Industry" and Mr. Meyer Bloomfield came on from Boston to make the principal address, selecting as his subject "The Labor Situation in Great Britain and America."

In opening the meeting S. H. Ball, Chairman of the Section, introduced H. H. Knox, President of the Society, who explained to the meeting the scope of the Society's Reconstruction program with regard to labor. Mr. Bloomfield then addressed the meeting and was followed by a general discussion, a number of the members being called upon by name.

The names of members who were present at the meeting follow: S. H. Ball, P. E. Barbour, C. W. Boise, F. P. Burrall, R. M. Catlin, J. A. Church, Jr., R. W. Deacon, H. A. Guess, H. W. Hardinge, J. E. Johnson, Jr., A. F. Keene, H. H. Knox, J. V. Lewis, O. C. Martin, L. W. Mayer, H. G. Moulton, C. W. Nichols, R. Peele, R. M. Raymond, E. Rickard, J. Roger, E. M. Rogers, C. A. Rose, F. Rutherford, F. P. Sinn, W. A. Smith, M. B. Spaulding, G. C. Stone, B. F. Tillson, G. D. Van Arsdale, J. A. Van Mater, W. Y. Westervelt, G. J. Young.

In addition to Mr. Bloomfield, who was the guest of the Section, the following named guests were present: C. S. Ackley, J. J. Blackmore, P. Brasher, L. H. Buttenheim, Major H. T. Curtis (Royal Engineers), E. H. Dawson, J. K. Erskine, Jr., J. B. F. Herreshoff, W. S. Hutchinson, F. E. Lee, S. A. Lewishohn, Capt. H. L. Mead, C. E. Mills, Lt. W. W. Raymond (Canadian Engineers), M. D. Riker, E. B. Sturgis, J. A. Traylor, T. D. Waring, R. T. White, L. Whiting.

**The Chairman.**—One of the subjects under consideration by the Mining and Metallurgical Society is that of Labor, and

the discussion this evening will be opened by our President, Mr. H. H. Knox. I can't imagine any worse waste of words than trying to introduce Mr. Knox beyond stating the fact that Mr. Knox is going to talk with us. (Applause.)

**Mr. Knox.**—When it was first proposed to invite the membership of the M. M. S. A. to devote the current year to the discussion of the readjustment of the mineral industry to peace conditions, the Allies were still pounding at the Hindenburg line and it seemed like a long look ahead to a peace that appeared still remote. To-day "reconstruction" is of the very atmosphere we breathe and of it the problems grouped under the caption of Labor loom ever larger until in the popular mind Reconstruction and Labor are fast becoming synonymous terms.

This evening marks the opening of a campaign in which every member of the Society wherever situated can and should enlist. As the connecting link between the employer and the employed, familiar with the outlook of both, the engineer stands sufficiently detached to survey the field impartially and to interpret each to the other without favor and without fear.

Before we embark on a subject so confused by human passions and inherited prejudices, it may not be amiss to point out certain dangers that beset the way and which must be overcome at the start if the goal is to be reached.

Max Müller has asserted that speech and thought are identical—a statement perhaps lacking in rigor but essentially true. Certain it is that every careless word or slovenly phrase is reflected in turbid thought. Therefore the first task may well be to clear the ground of the weeds that encumber it. The issues are befogged by the din of the catch words about us—classes and masses, class war, class consciousness, even capital and labor. These are arbitrary terms leading to false conceptions. Class is assigned according to the kind of collar a man wears. The capitalist is an elderly gentleman who drives to his office in a limousine, while the working man is one who wields a tool heavier than a pen and is paid by the day.

Would it not clarify our view to think simply in terms of wage earners and dividend earners? That dividends are deferred payments for services will be conceded by any holder of a Liberty bond mindful of the sacrifice he made to buy it last year. The interest on it received this year he rightfully recognizes as *earned*, hence the most advanced radical may without apology avow himself a capitalist.

As the major aim of existence Thomas Jefferson might have omitted life and liberty since these are included in the



pursuit of happiness. Though by no means the sum of all happiness the concept comprises the attainment of a maximum of comfort in return for a given output of effort and if we admit the reasonableness of this aspiration we can no more deny it to the dividend earner than to the wage earner. Yet for both it has its legitimate limits which we have seen overstepped by profiteers of low and high degree. But now we find a change passing over the nature of the aspiration itself and it may be restated as the attainment of a given quantity of comfort in return for a minimum of effort.

Commenting on the wonder of such an achievement as the reduction by two hours of the running time between New York and Chicago, or the prolongation of human life by five years, a recent writer asks "But to what use will be put the two hours or the five years?" Such a question dealing with the art of living must be answered if we are to treat the subject fundamentally since an increase in wage rates or a decrease in working time has small significance unless the increment of money or time is to be worthily spent.

The worse effect of a war of exhaustion is to be found not in the depletion of man-power and material but in the exhaustion of moral vigor. From the exaltation of patriotism, from the consecration of heart and mind and sinew to a single lofty end, the drop in potential is as sudden and complete as the discharge of a condenser. Fatigued nerves break down to irritability; spirit relaxes; the will to victory gives place to the longing for ease. These effects permeate society from top to bottom, they are manifested in the demand for a shorter working day, in the astounding slackness of service pervading all activities; they invade education and menace scholarship. The experiences of an examiner of candidates for engineer commissions lead him to wonder if descriptive geometry is any longer taught in the technical schools. For admission to Yale Latin is removed from the requirements. Princeton abolishes Greek as an essential to the B. A. degree. The tendency to the evasion of responsibility, to the shifting of trouble, is no less conspicuous at the top, in superdiplomacy and ultrastatesmanship. The world is engaged in the one absorbing game of passing the buck. From a hardy, high-spirited race, locked in a death-grip with the powers of hell, we Americans have become in a few short months so relaxed in tone that we shudder at a beer bottle and banish it from sight lest we succumb to it. (Laughter.)

The inevitable accompaniment of this frame of mind is an excess of sentimentality, for high sounding generalities appeal to the indolent where hard realities are repugnant, and herein

lurks an insidious danger. The power of sentimentality to warp the heart as well as the head is traced in the circumstance that so many social workers are pacifists and so many pacifists are disloyalists. As I see it, therefore, emotionalism ranks as an evil with demagoguery and greed.

A press dispatch from Paris dated March 29 informs us that "The Commission on International Labor Legislation has concluded its report and has drafted clauses for insertion in the treaty of peace" and further that "This new charter of international labor lays down as a principle that in right and in fact the labor of a human being should not be treated as merchandise or as an article of commerce." Excellent. By the magic of claptrap we are relieved of the humiliation of buying another man's services or selling our own! It recalls those words of Theodore Roosevelt: "Of all broken reeds sentimentality is the most broken reed on which righteousness can lean."

Just as the seeker for scientific truth, even one so devout as Isaac Newton, is constrained rigidly to exclude all teleological conceptions, so it were well for us in our investigations to keep altruistic considerations separate in our minds. The commonplace virtues of justice, good faith and fellow feeling must be taken for granted as part of the conditions of progress but the introduction of the more abstruse moral terms will scarcely lead to clarity. If enlightened self-interest (with due emphasis on the adjective) be our fundamental principle it may easily ensue that quite as the supposed conflict between science and religion has become a myth so will any antagonism between industry and altruism prove in the end to be fanciful.

Although the great preponderance of the work of the world is not performed by the hand directly but by those extensions of the hand we call tools, or, in their more complicated forms, machines, nothing is stranger at first sight than the unquestionable fact that the progress of industry is parallel to the development of machinery and owes nothing to improvement of the hand. Indeed manual dexterity has deteriorated in recent generations in all industrial countries and most of all in America as is evidenced by our dependence on foreign lands for almost all commodities requiring manual skill in their fabrication.

That without any contribution from him as a mechanism the laborer has shared in the advancing civilization brought about by moral and mental forces is made manifest by comparing present conditions with those of bygone ages. Any example will serve as an illustration but here are two drawn at random:

Two thousand years ago the silver mines of Laurium, in Greece, were worked by slave labor. The contractors (of a type not yet totally extinct) discovered that the economical life of a slave was three years—it paid to work and starve the machine to death in that time, then to scrap it and buy another. To-day the mines are worked by a French company and it is safe to say that the common laborer lives in a degree of comfort that in many respects would have been envied by the slave-driver in the Golden Age.

At the close of the black plague in the XIV century an act of Edward III fixed the daily wage of the farm laborer at one penny and provided a work day of about sixteen hours or from sunrise to sunset. Thus social progress has not overlooked the hired man.

Such contrasts of the present with the past have been brought about by brain, not brawn, and the question suggests itself whether hand labor is not susceptible to progressive improvement to the benefit of the worker and the commonwealth? Though the manual laborer has benefited by social evolution he has as such contributed nothing to it and it may be that the time is at hand when society shall turn to him to perform his part in further advancement by so increasing his own effectiveness that the return to him for a given effort may be correspondingly enhanced. At all events this aspect of the subject is worthy of more attention than it has yet received.\*

The problem of capital and labor, so called, has been widely and profoundly studied by individuals and has been the occasion of a voluminous bibliography but the collective method of approach now proposed is as far as I know untried though promising distinct results. A Society such as ours, composed of members standing midway between the principals, is exceptionally fitted for such an enterprise. As employers of labor in the interests of capital they are necessarily students of the subject but while their studies remain circumscribed by their own narrow environment, their conclusions will be correspondingly limited. On the other hand if it is made possible by means of publication for each to communicate an account of his own experiences, experiments and conclusions, be they failures or successes, and in return receive the contributions of all, the result will be not a mere symposium but will furnish the material which in the competent hands of a committee appointed for the purpose may be collated and digested and welded into

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\*A suggestive little book along these lines is "The Human Machine and Industrial Efficiency" by F. S. Lee, Longmans, Green & Co., New York.



a constructive contribution to the subject. That the issue will mark a real advance toward the enlightenment of both the laborer and the capitalist we are entitled to hope but one thing admits of no doubt. It will assuredly promote the instruction of the engineer.

Finally, if I might venture to propose an ultimate aim of our endeavors it would be that Utopia, after all perhaps not so many leagues distant from our shores, where all men are workers and where all workers begin life as wage earners and end as dividend earners. (Applause.)

**The Chairman.**—Mr. Meyer Bloomfield is well known for his researches upon labor in the United States. Mr. Bloomfield has recently returned from some five months in continental Europe and Great Britain where he has made a detailed study of the condition of labor and capital in those countries. In business houses and at mines I think the manual which we usually have at our right hand is perhaps that which Prof. Peele so ably produced. When we are on the trains and in our own homes I think perhaps the *Saturday Evening Post* is the more common manual among engineers than any other. Probably a number of you have read the last three issues in which some very interesting articles by Mr. Bloomfield have been appearing. I have great pleasure in introducing Mr. Meyer Bloomfield. (Applause.)

**Mr. Bloomfield.**—Mr. Chairman and Gentlemen: I haven't come down from Boston with any theories, strange to say, or with any isms. If I had, what I know of the temper of this company, and my knowledge by name at least of members here, would have made me cast aside any attempt to put over an ism. I have brought down some papers and documents—not to read from, but because there may be occasion to refer to these papers when material. But mostly I want to think along with you, first on the general matter of what is happening in Great Britain and what it means to us, and perhaps then there may be a few moments to consider one or two rather practical problems.

I was interested especially in the concluding words of Mr. Knox. His appeal to the engineer to tackle the labor problem in the characteristic engineer's way deserves to be stressed over and over again, because in the final analysis whatever is sound in the way of industrial experimenting will, after the acid test that you are accustomed to use, prove out any proposition. No matter what any program proposes, however fine-sounding and however promising, its final acceptance, its incorporation in the scheme of things, will depend on tested experience, analysis

and results, such as you are accustomed to when you apply laws to things. So, it is the engineering mind and the engineering attitude which is needed.

In one of the six *Saturday Evening Post* articles, I made the special reference to the need of the engineering viewpoint and the engineering method as regards these labor problems, and I have thought so and recommended so for this reason: Scientific management, especially as we associate it with the name of Taylor, left off where another new branch of analysis and long study is beginning. One of these days some of us with your help will try to formulate a functionalizing of labor management in terms of duties and responsibilities, chart-allocated to the different groups, and there are distinct items which one could mention if that were the main topic; but these thoughts are merely given to you provisionally and because we lack just that scientific scrutiny that you can give to them. Some of us, however, are convinced that a new type of industrial management is possible on the basis of an analysis of the contribution which the different parties to the labor bargain may make, analysis of the loads which each party ought to carry.

We come, however, to the general meaning of the British labor situation and it is of leading importance to us because Great Britain is more or less setting the pace. It must set the pace. It is half way between Russia and America, socially speaking, and the influence of Russia, good or bad, is considerable, in labor especially. We are all in favor of wanting to see the right thing done, whatever it may be; we all want justice done; and, if we could agree on a definition of industrial democracy, the chances are that most of us would find ourselves pretty liberal. I haven't found many real reactionaries either here or abroad, and a reactionary I should define as one who makes two Bolsheviks grow where only one grew before. (Laughter.)

I suppose in this matter of definition we do go astray. I heard Bernard Shaw not so long ago tell this story. He said there was a country parson who loved the countryside and his automobile and who used to go out whenever he wasn't very busy with his parochial duties. It was a very pleasant summer for the motorists but it was a drought for the farmer and his parishioners who were farmers brought a petition asking him to send up a prayer for rain. He did so on the following Sunday, saying, "Oh, Lord, send down a gentle rain, just enough to moisten the fields and farms, not to spoil the pleasures of the beautiful countryside but to help the farmer and to help the fields to become fruitful." A Sunday later while he was



carrying on services rain broke and it turned to hail and there was a terrific commotion, a thunder storm; and a clap of thunder and a burst of lightning brought down the steeple, and the parson looked up and said, "Now, God, this is simply ridiculous." (Laughter.) Mr. Shaw pointed out that many of us were talking of democracy, interested in democracy, but somehow or other we were rather cold in face of it.

Now, England has adopted on a pretty big scale the idea of organized systematic conferences between management and men, conferences not for the purpose of settling a grievance which reaches the explosion point, and conferences not merely to consider grievance after grievance, but conferences to share in the constructive problems of the industry. Now, there are two classes of minds in Great Britain which oppose this idea. One, a very small, very negligible, almost disappearing class of men, who have never had to regard anyone else in any decision they make as regards their property or their management. At the other end of the scale is a group of very radical and very clever and very brilliant labor leaders, or rather of men outside of the wage earners' field, who are, however, very close to the wage earner and very influential; a body which absolutely opposes and writes fiercely against any such arrangement, on the theory that any getting together of management and men must mean a compromise and a weakening of the militancy which the worker must carry to its extreme in order to accomplish the abolition of the employer.

Between these two fires something like thirty industries already are at work on matters of orderly constructive conference, and it is my belief that the labor situation in England will settle down to a large and widespread system of beginnings, at least, in management sharing, in discussion; and finally passing over to the body of employees a number of questions which hitherto have been the sole responsibility and interest of the management: Questions, for example, such as discipline, shop rules, improvement of surroundings; problems of hiring, of organizing labor supply, of building up the morale of the men; promotion, dismissal, pensions and the large body of miscellaneous activities we group under the phrase "Welfare Work." The conference system works through a national council speaking and acting as a sort of a forum for the industry as a whole, the national industrial council, a district council which takes a smaller unit, and a local works committee or a plant council.

In connection with that movement, which is extremely promising from every viewpoint, there will be nationalization in three or four very distinct directions. It is quite likely that



the coal mines will come under national control. There are fifteen hundred mines and over three thousand owners. There has been confusion, disorder, lack of team play, the men actually doing the right thing as employers finding their work constantly undone by those who won't play the game. The miners have been pretty rapidly converted to extreme doctrines. The coal fields have been the hotbed of Russian revolutionary sentiment and conditions cooperated to make that hotbed a source of mischief. The miners are irreconcilable. Out of sixty Labor members elected in December on the Labor ticket, more than twenty-five were miners. They are strong, extremely well officered, they have a college, so-called, for their own which has been for years carrying on classes in Marxian economics, and they have a most aggressive revolutionary press. There seems to be no alternative but nationalization, because the country, and other industries, cannot afford the constant threat and peril as at present and as the past has produced. Well, one might say, if this be nationalization, then we have Socialism, or, worse still, this is Bolshevism! Is it? Just this word of caution. Let's not spread Bolshevism unnecessarily by calling names. Let's not call something Bolshevism just because we do not like it or do not approve of it. We do infinite mischief.

It is possible that the railway system will be nationalized, or that at least a great deal more national operative control will take place, and that, finally, other means of transportation may be, and that the supply of power is almost sure to be, nationalized. Then what? If nationalization doesn't work—the Briton is a rather independent thinking person—if it doesn't work he will bring things back again to a working basis, but what is sure to be universal in British industry is representation in industry of the rank and file. Now, from certain viewpoints nothing could be more desirable, but the immediate injection of rank and file representatives in American industry because of some benevolent impulse would be most unwise. We are so fortunately situated in this country that we have the time to think things over. We have time to make up our minds, and then to take steps sanely, coolly, sympathetically—to undertake those step by step adjustments, which, though they may not settle all labor unrests and all labor problems, will make so much more easy the settling of any labor situation as it arises.

Organized labor in this country on the whole, at least insofar as its big leaders are concerned, has been during the war and even at this time is constantly stressing its essential conservatism, its loyalty, its patriotism. They are not foolish. They

ask something in return. They say to you, "We are the bitter opponents of the I. W. W., we want to see industry prosperous, we ask you to let us work with you," and they are going to say that more and more; they are going to say it to you personally, they are going to say it to your industry. I do not mean to say that their loyalty or their patriotism had any ulterior motives, but, as I say, they are frank about that. I have sat with the Labor Councils from coast to coast, and throughout the war I have heard men say at these conferences, "We will do our part, we will go ahead, and then we want to ask industry if we are going to be treated like men."

Now, that is going to be asked, gentlemen, and they have piled up a record to be submitted to you. Mr. Gompers is coming back with a smashing attack on Bolshevism, I. W. Wism. He is going to ask in behalf of the laboring men of the country that they be given due recognition. I do not expect to see our country plunged into madness any more than I expect Great Britain to plunge into madness, any more than I expect even Russia, still less Germany, to continue madness. People can't live long on that basis. There are certain things in industry that can't be monkeyed with. There are fundamentals in production that can no more be juggled with than you can juggle with arithmetic, and, for all the flying leaps that certain schools of radical thought may have in mind, a close view of industrial operations and the laws which govern production is enough for most of us to keep our feet on the ground. How well do we know our men, how well do we read their impulses so as not to misunderstand what they are really driving at despite the language and the agitation? How well are we informed?

Now, I find that, however astute and wise the employer or the manager may be, as a rule he has specialties quite other than that which might be termed the labor specialty, and anyone who fails to recognize that dealing with labor situations, that analyzing of labor conditions, is a technical specialty by itself has too superficial a view. We are all of us more or less poor as regards sources of information on the basis of which alone can we have some judgment of a given labor situation. If you are at the top in the management scheme your very eminence exposes you to all sorts of unconscious misinformation. Facts which should be seen impersonally, analyzed disinterestedly, become discolored through a chain of personal equations, no one choosing deliberately, of course, to mislead. Now, among the first lessons which the manager and which industry must learn is that of organizing information which is informa-

tion, precisely as you collate your reports on the basis of which your investments rest. There are very few places where that sort of thing has been done.

I have brought for your inspection material which I am going to pass around. I was privileged to take out of the country after a good deal of explanation, and trouble with the censor, one of the few things of what I should call the right sort of method to be followed in this vital matter of labor information. The Ministry of Munitions has an intelligence and statistics section, so also has the Demobilization Department under Sir Stephen Kent, so also has the Ministry of Labor. You will be interested to see from these reports how the government there, through disinterested, honest, unbiased experts, hearing of a movement like the shop steward movement, instead of relying on the press reports as to what that movement may be, made a cold analysis of what the shop steward movement meant. Here is a piece of work which illustrates good methods, good work, on the basis of which the Ministries were able to follow industrial movements. In the same way a set of reports, which I have here, was made on the labor situation in the shipyards. This was made under the Ministry of Shipping.

I need hardly say to the engineering mind and temperament that no one will ever be straight on the labor situation who is biased. We are sure to misjudge, and do an injustice both to the integrity of our own minds and to those we wish to serve best. In the second place, second to freedom from bias, is the need of organized, responsible, reliable information. And third, there is an obligation, at least for scientific purposes, to put it on the lowest grounds, to start at once experimentation to see how far and how fast we can begin to satisfy these human impulses which are abroad.

Failing to do this, you have two camps and not an organization! Failing to do this, we don't capitalize the values that are there! Doing this, even in small tentative beginnings, there is no limit to the good will, which is always the secret of real output and economy. Here is the beginning of good will and the beginning of right relations! (Applause.)

**The Chairman.**—Mr. Bloomfield's very thoughtful talk is now open to discussion. Mr. Sam A. Lewisohn is with us tonight. Will you say something, Mr. Lewisohn, on the subject of labor?

**Mr. Lewisohn.**—I do not believe that there is any individual who occupies a more influential relation to the puzzling industrial problems that face our generation than the engineer.



Big business and large scale production have brought about a condition whereby most plants are operated by men who are technically equipped engineers. It is such managers who are the real influential factors in the daily relations of the management to the employees. The so-called "absentee landlord" can exercise only a very indirect influence. Directors, even if they have the inclination, sympathy and time to study the labor problems, feel it is wise, in most cases, not to interfere with the work of the manager in charge, because local labor problems are so interwoven with the daily routine of other operating problems that they have not the intimate knowledge of the situations to justify them in so doing. For the engineer manager to put any policy into effect he himself must be convinced; to use a colloquial expression, the proposition must be "sold" to him. Now the fact is that the primary training and experience of most engineers is in the reactions of dead matter, not in the reactions of men to men.

Unfortunately, in our technical schools there has been very little, if any, attention paid to the modern technique and methods of handling labor; and in this connection may I suggest that every technical man should use his influence to have courses of such a character included in our technical schools. Just as in his previous training, the later professional life of the engineer is for the most part absorbed in problems, connected with the reactions of dead matter—problems which permit of quantitative methods.

Now human beings function on very different principles from dead matter. To the problem of creating industrial morale the ordinary quantitative method of the material sciences cannot be applied, and it is of first importance that engineers realizing this face the fact that this problem is a specialty in itself and for its solution often requires specialists such as employment managers. It will necessitate quite a personal readjustment on the part of the engineer, but I have no doubt that he will make it. I feel that it is in a way fortunate that he is in such a pivotal relation to the problem. There is no profession which is more thorough, devoted and painstaking in its work. It will be indeed a fortunate thing for the world if the engineer brings to this human science the same devotion and thoroughness that he has applied to the material sciences. (Applause.)

**The Chairman.**—Mr. Tillson, will you give us your views of this subject?

**Mr. Tillson.**—Mr. Chairman and Gentlemen: I presume that this subject is of special interest to us because of the effect

that past actions are now provoking in their reaction, and as a result, probably because of the human element involved in this question, these reactions have considerable inertia, naturally, past the point of equilibrium, which is that of human justice. In considering the work of the engineer for improving human efficiency as it applies to the use of labor, we naturally are led to the possibly much discredited present field of efficiency engineering, and that is probably discredited because of the numerous instances in which it has been misapplied. Perhaps many of those who have had the advantage of superior information and judgment in applying efficiency methods of organization have profited more than they justly should have, considering their share in the results obtained, and they thereby brought considerable unrest on the part of the laborer upon whose efforts they have so profited.

We find, therefore, that labor is extremely suspicious and, when organized, opposed in a large degree to the introduction of methods which it feels are likely to reduce the power of labor organization by virtue of their stimulation of personal endeavor on the part of the wage earner. In that case it seems as though the logical thing to oppose extreme reactions on the part of labor is to cultivate the individual development of the wage earner, and to do that we must realize that all humans, ourselves and the wage earners, appreciate the feeling of having developed personal initiative and ability along our lines of work. All of us would feel very much disappointed in life if we reached the conclusion that we were mere puppets or machines which would be operative at the will of others without our operations having produced any development of our own initiative and abilities. So that if it is possible to stimulate by education the development of initiative in all people, in even the lowliest wage-earner, we probably will satisfy his life to the extent of some craving with which he is not familiar himself. Part of his unrest may be due to a craving which he cannot analyze, that being a tendency to develop his own personality.

Now, many of us, when given a chance to express our personalities, are quite satisfied to bow our own personal opinions to those whom we admire for their superior ability. Perhaps it will be so with laborers when they as individuals have a chance to develop their personalities. Undoubtedly the objection of organized labor to piece-work, which at first thought seems an adequately fair remuneration of services and seems an incentive to develop ability in a wage earner and to reward the efficient man in proportion as he produces more work, is,

I believe, due to its fear of the development of personal greed or desire in the workman, and thus through the love of money furnishing a strong motive power to disorganize unthinking collective loyalty to organized labor; but another thought is probably present in the minds of labor leaders and that is, as to whether it has been customary, when piece-work has been involved in operations, for the wage earner to receive a just proportion of the additional benefits which have accrued from his ambitious endeavors. Some consider that piece-work from that viewpoint hasn't been just and that the additional productivity of a wage earner should be reimbursed at a greater ratio than the arithmetical ratio of increased wages for increased production because of the fact that overhead expenses in an industry in its many varied forms are all reduced in proportion as the rate of work per unit of labor is increased. That is undoubtedly true, and people who do not favor the piece-work from a laborer's point of view take the stand that the laborer should share in a certain percentage of the profits involved.

This leads us to the subject of profit sharing. It has not been my pleasure to learn of a wholly satisfactory solution. In the extreme the problem seems to me to be formulated in a somewhat simple manner, not that I advocate this as being the best solution, but still it is carrying the problem to the ultimate. Financiers invest certain capital in an industry and since capital alone represents labor—it is something which has been produced by labor and it is merely another token to symbolize labor which has been performed in the past—they can expect a just return and a fair return on that former investment of labor which they have made. Suppose then, for argument's sake, we assume that 6 per cent. is a fair return on invested capital. Besides capital in the industry there is the large salaried class or overhead expenses. Their normal returns are the salaries paid them. The third class are the daily wage earners. Their normal return is a fair wage standard, which they receive.

Now, if the profits of that company permit the payment of a normal annual return of, say, 6 per cent. of capital, also the salaries and wages which are their normal returns, what is to be the division of the surplus? Perhaps that division then should be based upon a hypothetical gross capitalization involving a fair assumption as to what is the capital value of the salaried force and what is the capital value of the wage earners. Surely their annual income cannot be their capital value, so I will



leave the problem before you as to how we can arrive at the capital value of the wage earners in the industry and of the salaried pay-roll in the industries.

It seems to me that the engineer, as he is going to be in such close contact with this problem of labor reconstruction, has the task of solving it. It is one of the most gigantic engineering tasks which he can undertake. (Applause.)

**The Chairman.**—Mr. Rickard, you have recently come from the other side—from France, I believe; what is the labor situation there?

**Mr. Rickard.**—I fear that I am not in a position to discuss that subject. However, I have been thinking that as Mr. Bloomfield is present, he might be able to expand a little bit on the question of welfare work. It seems to me there is a great deal of misdirected energy in that direction, and, as Mr. Bloomfield in his talk this evening has suggested an idea, it occurs to me that he might care to expand for a moment on that idea. I think we would much prefer to hear from one who is expert in those matters than from an amateur.

**Mr. Bloomfield.**—I should be very glad to say a word about "welfare." The first and principal trouble with welfare, so-called welfare work, is that it has been launched with a confusion of motives rather than with a clear and clean-cut appreciation of what its place in industry really is. I am very much in favor of all that has been done under the heading of welfare work; that is, I am in favor of good air and good food and rest periods and fire escapes and a sprinkler system, and all the other things that make for wholesome production. Now, where welfare is launched for any other reason than that it is good business it is sure to bring about a confusion of motives. Nobody objects to working in clean surroundings. That should be a matter of course. Clean surroundings should be a sign of adequate management, and the absence of proper surroundings should be the sign of inefficient management; the workers see this, so why should there be any illusions? If welfare work is not good business, give it up; if you don't give it up it is probably good business, and on that basis nobody has any complaint.

Now, in the way of good business, of sound administration, the human imagination has more and more play. If you see needs, if you see obstacles to efficiency, if you see that a good

water supply and hot coffee are good things, if you see other needs and you proceed to bring them about, that is a sign of more and more expert management, but it isn't benevolence, it certainly is not charity, it isn't essentially kindness, it is just ordinary, or rather more than ordinary, business administration. On that basis nobody's self-respect is trampled on. So, with right motives, I mean with clear thinking, all sorts of welfare work is possible.

Now, we come to another phase of welfare work. Those improvements, those social betterments, outside of the strictly technical ones under the control of the works manager or plant engineer or factory architect and so on, those social betterments which are suggested or initiated or organized from the bottom up are apt to be more lasting and more useful and more permanent than those that proceed from the top down.

The Bethlehem people some time ago did a very good thing out at Fore River. The management had in mind a service building. Now, instead of going to an architect and asking for a design they proceeded to organize demands from below. When that demand became articulate, they asked the men to name a committee of five workmen who would be sent on a two weeks' tour of other plants by the Fore River Company to see what was what in the way of service buildings, and that then these employees would come back and make a report both to the management and to the working force on what they had seen and what impressed them the most. They took that two weeks' tour. They made that report. The company paid all expenses. They came back and had very intelligent suggestions to make, with the result that the service building works and nobody looks upon it as a substitute for good wages.

This question of physical and medical examination of the workers is a very ticklish one, and yet we know that nothing is better for the workman, nothing better for the work, nothing better for the community than medical inspection, but you can't put it over by the usual methods.

Now, there are two instances in which this thing was put over. First, in connection with a printing establishment. The men were not going to have any invasion of their privacy. One day a pressman's helper was suddenly seized with a fit and fell against the lever which started the press, and the head pressman was right where he was torn to pieces. Well, the result is that there is a medical examination of every man who comes to work in that establishment. The employees insist upon it.

They want to know whether a man is subject to fits or heart disease.

The same thing happened in a department store, to give you the other instance. There everybody was more or less touchy. The free-born American citizen who runs an elevator wouldn't submit to medical examination, so, lo and behold, one day one of the elevator men was seized with heart disease, his elevator stopped midway, full of passengers. The employees had a general benefit association and this question came up and so they were all in favor of medical examination; but, to offset this suspicion of the invasion of privacy, the rule was made with the cooperation of the management that the nurse and the doctor would remain in employment as long as they proved acceptable to the employees; and from that day to this medical examination has never been in question, and cases of dangerous disease, or infections and things of the sort which imperil the whole community, all of that took care of itself. And so, welfare work is all right provided it is treated as square, honest, good business administration and provided that there is opportunity for those who are to be welfared to do some originating. (Applause.)

**Mr. Spaulding.**—Just one word in regard to Mr. Bloomfield's statement with reference to medical examinations. During the period of the war I happened to be associated with the ship-building industry, and one thing I have particularly in mind is that there was a medical department and that all of the labor was thoroughly investigated by it before being employed, and that it was found very satisfactory. It eliminated all question of danger from fits or heart failure, or anything like that, and I think that the men themselves appreciated it. The company employed the doctor and the nurses, and the system was found to be very satisfactory.

Another thing which has been drawn to my attention by Mr. Bloomfield's remarks is the functionalizing of labor. I found that there was a great deal of friction, considerable friction, between unions, each claiming that the other was stepping into its territory. So finally I decided upon three things; the first was cooperation with the unions, the next was the question of conciliation, and the third was collective bargaining. I found it was very, very successful and, for a period of over a year, the labor situation was much improved, whereas



in the beginning we had considerable trouble and considerable friction.

After a vote of thanks had been extended to Mr. Bloomfield, the meeting adjourned.

G. D. VAN ARSDALE,  
*Acting Secretary for Section.*

## COUNCIL.

### EXECUTIVE COMMITTEE.

Meeting of April 3, 1919.

In the absence of a quorum of the Council for the meeting scheduled for April 3, 1919, the President called a meeting of the Executive Committee. This meeting took place at the Columbia University Club at 5:50 p. m., preceding the meeting of the New York Section, held at the same place later in the evening.

In addition to H. H. Knox, the President, Messrs. Ingalls and Penrose attended the meeting, and R. M. Catlin was invited to be present. The Assistant Secretary also attended. The minutes of the Committee for February 27 were approved.

**New Members.**—It was announced by the Secretary that Ballots Nos. 79 and 80 had been counted on February 7 and March 15, respectively, and that the following new members had been notified of their election: Charles W. Boise and Charles A. Rose; Clinton H. Crane and Robert M. Keeney.

**War Minerals Committee.**—The President having announced that the War Minerals Committee had completed its labors, on motion unanimously passed, the Secretary was instructed to convey to William Young Westervelt the thanks of the Council and the Society for his untiring efforts in behalf of the Government during the war as the representative of the M. and M. S. A. on this Committee.

**National Service Committee.**—The Secretary having reported that an invitation had been received from the National Service Committee of the Engineering Council to appoint one delegate to join a Conference of Engineering Societies, to be held in Chicago on April 23, 24 and 25, for the purpose of taking action on "the creation by Congress of a Department of Public Works," on motion unanimously carried, J. Parke Channing was chosen to represent the M. and M. S. A. at this conference.

**Membership Statistics.**—The Secretary submitted the following schedule as showing the status of the membership at this date:

| Membership Statistics.                        |   | April 3   |
|-----------------------------------------------|---|-----------|
| Membership, January 1, 1919.....              |   | 306       |
| Members elected since January 1, 1919.....    |   | 8         |
|                                               |   | <hr/> 314 |
| Members resigned .....                        | 2 |           |
| Members dropped .....                         | 1 |           |
|                                               |   | <hr/> 311 |
| Applications before Council .....             | 1 |           |
| Applications before Members .....             | 3 |           |
| Applications before Executive Committee ..... | 0 |           |
| Applications in office .....                  | 2 |           |
|                                               |   | <hr/> 317 |

**Reconstruction Program.**—Except for the reading of suggestive letters from members no action was taken under the program of "Reconstruction." Definite announcement was, however, made that the following committee appointments had been made and accepted:

Committee on Economics: W. R. Ingalls, Chairman, F. W. Bradley and J. R. Finlay.

Research Commission: G. D. Van Arsdale, Chairman.

Committee on Quicksilver: F. F. Sharpless, Chairman.

Committee on Chrome: Albert Burch, Chairman.

Mr. Ingalls reported for the Committee on Economics that satisfactory progress had been made and that the members of his committee had shown great interest.

The meeting adjourned.

EDWARD B. STURGIS,  
*Acting Secretary.*

## OBITUARY.

### JOSEPH ESREY JOHNSON, JR.

In announcing the lamentable death of J. E. Johnson, Jr.—it was in this way that he generally signed himself—the Secretary is able to include a biographical sketch very largely prepared by Mr. Johnson himself. Thus, even though it covers simply a bare outline of his professional career, it is a satisfaction to know that this record is Mr. Johnson's own.



JOSEPH ESREY JOHNSON, JR.





Joseph Esrey Johnson, Jr., prominent among the younger iron and steel metallurgists, died very suddenly at Hartsdale, New York, on April 4, 1919.

Mr. Johnson was born at Longdale, Virginia, July 10, 1870. He was the son of Major Joseph Esrey Johnson, an officer in the Union Army, and Mary Roche.

He was prepared for college by a tutor and graduated at Haverford College, Pennsylvania, in 1888. After two years in the drafting room of the Baldwin Locomotive Works, he returned home for a year's study, and in 1891 took his Master's degree of M. E. That autumn Mr. Johnson entered a post-graduate course at Cornell and took his Master's degree in mechanical engineering in 1892.

After some valuable experience as assistant to the president of the Cranberry Iron & Coal Company in North Carolina, he entered the employ of John E. Sweet of the Straight Line Engine Company in 1893, and went from there as assistant to the engineer of tests of the Solvay Process Company, and in 1894 as assistant to the superintendent of the Ames Iron Works, Engine Builders, Oswego, New York. In 1895 he was offered the place as Engineer and Assistant Manager of the Longdale Iron Company, where he remained (with the exception of a few months as an engineer officer in the Navy in 1898) until 1899. From 1899 to 1901 he was with the Carnegie Steel Company at the Edgar Thompson and Duquesne Works, part of the time as master mechanic at the Duquesne blast furnaces.

In 1901 he returned to Longdale and remained there until 1906 when he became General Manager of the Princess Furnace Company, Glen Wilton, Virginia, whose plant he practically rebuilt. In 1909 he went as General Superintendent of the southern furnaces and coke ovens of the Republic Iron & Steel Company at Birmingham, Alabama.

In 1910 Mr. Johnson was appointed Manager of the blast furnace and chemical plant of the Lake Superior Iron & Chemical Company at Ashland, Wisconsin, which he largely rebuilt.

In 1913 Mr. Johnson opened offices as Consulting Engineer and Metallurgist at 52 William Street, New York City.

Late in 1916 Mr. Johnson went to China in the interest of New York capital.

Early in 1917 he published "Blast Furnace Construction in America", and early in 1918 the companion volume, "Blast Furnace Principles, Operation and Products".

Mr. Johnson was married to Margaret Hill Hilles of Wilmington, Delaware, in April, 1902, who, with one son, Joseph Esrey Johnson, the Fourth, survives him.

Mr. Johnson was a director of the American Institute of Mining and Metallurgical Engineers, a member of the Mining and Metallurgical Society of America, American Society of Mechanical Engineers, American Electrochemical Society, American Iron and Steel Institute, British Iron & Steel Institute, American Institute of Weights and Measures, American Society for Testing Materials, Bankers' Club, University Club, Engineers' Club, and Scarsdale Golf and Country Club.

## CHANGES OF ADDRESS.

Claghorn, C. R.....621 Tacoma Bldg., Tacoma, Wash.  
 Drucker, A. E.....30 Church St., New York  
 Ingalls, W. R.....115 Broadway, New York  
 Pomeroy, Wm. A.....Kennedy Bldg., Tulsa, Okla.

## PERSONALS.

S. H. Ball started for the Southwest on April 10 and is to be absent from his office for about one month.

E. S. Berry, captain of engineers and formerly attached to the 27th Engineer Regiment, remains in France to assist in determining the damage done to the mines in that country and Belgium.

W. O. Borchardt contributes an article on "Estimating Screen Efficiency" to the April 12 issue of the *Engineering and Mining Journal*.

P. R. Bradley is Federal Food Administrator for Alaska with headquarters at Juneau. This information has come to hand only recently and it is not known when Mr. Bradley received his appointment.

Frederick Burbidge has been in Oklahoma on a trip of inspection for his company.

Albert Burch has recently made an examination of gold properties in El Dorado Co., California.

Frederick P. Burrall, who sailed for England in November last, returned to the United States early in March.

G. Caetani, it is reported, has withdrawn from the firm of Burch, Caetani & Hershey. It is further stated that he will no longer practice his profession.

F. G. Cottrell is given full credit, in an article appearing in the *Mining and Oil Bulletin* for March entitled "The Dehydration of Petroleum," for the invention of the apparatus now in quite general use for dehydrating crude oil emulsions.

W. B. Devereux, Jr., who was eventually promoted to the rank of major in the aviation corps, has returned from France and will again take up his professional career.

Walter Douglas, who sailed for Europe in January, landed in New York on March 30. It will be recalled that Mr. Douglas went overseas as a member of a committee to investigate the copper situation.

H. S. Drinker, in the latter part of March, wrote at considerable length to the *New York Evening Post* on the League of Nations. Doctor Drinker's analysis of the covenant was in reply to the inquiry which the *Post* has undertaken among men of prominence.

A. E. Drucker has severed his connection with Howard, Morinni & Co., Inc., and will open an office on May 1 at 30 Church St., New York, where he will again take up the general practice of a consulting metallurgical engineer. It may also be announced that



Mr. Drucker has organized the Drucker Smelting Corporation, of which he is the president and treasurer. This company has for its purpose the recovery of metals from foundry residues.

Stanly A. Easton, although no longer president of the Idaho Mining Association, still retains his connection with this organization. At the annual convention, held at Boise on February 11, he was elected a delegate-at-large.

S. S. Fowler, who was present at the Vancouver International Mining Convention in the middle of March, submitted a resolution to the effect that the British Columbia government should inaugurate a mineral exploration of the northeastern section of that province. This resolution was adopted.

W. R. Ingalls, who for 14 years was editor of the *Engineering and Mining Journal*, has retired from that position and will again take up the practice of a consulting engineer, with offices at 115 Broadway, New York. It is explained that Mr. Ingalls will remain with the *Journal* as consulting editor.

D. C. Jackling was in Utah during late March and early April. It is reported that he is on a tour of inspection.

Hennen Jennings, beginning with March, will be in California for a number of months.

John G. Kirchen, according to the *Engineering and Mining Journal*, was badly injured when recently visiting the White Caps mill at Manhattan, Nevada.

Oscar Lachmund has an article in the March 29 number of the *Engineering and Mining Journal* entitled "Tunnel Driving at Copper Mountain."

C. O. Lindberg, who during 1918 devoted much time to the examination of sulphur deposits for the War Minerals Investigation, reports that his share in this work was not completed until about January 1, 1919.

D. A. Lyon, who recently moved his headquarters to Pittsburg, is inspecting Bureau of Mines stations throughout the West.

B. Magnus reports that he was discharged from active service in December. It will be recalled that Mr. Magnus was commissioned a captain of Engineers.

Richard A. Parker writes to say that, in addition to being a director of the Mining Bureau of the Denver Civic and Commercial Association, as announced in the February issue of the *BULLETIN*, he is also the chairman of this body.

Robert Peele's book on "Compressed Air Plant" has appeared in the form of a "third edition, largely rewritten" published by John

Wiley & Sons, Inc. In his preface to this last edition, Professor Peele states that, whereas the size of the volume has not been increased, certain chapters have been entirely rewritten and others expanded, sufficient space being obtained by omitting or condensing old matter.

F. A. Provot, who had been in Paris for something like nine months, arrived in this country on or about March 15.

J. E. Spurr, Executive of the War Minerals Investigation has arranged to take charge of the physical examinations for the War Minerals Relief Commission. Some part of his field force is already at work.

J. B. Tyrrell was in Timmins, Ontario, very early in April.

Arthur L. Walker still remains in the Federal service. Professor Walker's official title now is Consulting Metallurgist to the Inspection Division of the Ordnance Department.

Harry J. Wolf, who was in El Paso, Texas, some little time ago, later made an examination of mineral properties in Sonora, Mexico.

**MEMBERS OF THE SOCIETY WHO HAVE BEEN  
CALLED INTO THE SERVICE OF THE U. S.  
GOVERNMENT AND THE ALLIED ARMIES.**

Lawrence Addicks.....Member, U. S. Naval Consulting Board  
 Ralph Arnold.....Member, Board of Tax Reviewers  
 Edwin S. Berry.....Capt., 27th Engineers  
 P. R. Bradley.....Federal Food Administrator, Alaska  
 Reginald W. Brock.....Major of Canadian forces  
 Alfred H. Brooks.....Lt. Col., Engineers, A. E. F.  
 Gelasio Caetani.....Capt., 1st Reg. of Engineers, Italian Army  
 J. Morgan Clements....Bur., Foreign and Domestic Commerce  
 Benedict Crowell...Major, Eng. Corps; Asst. Secretary of War  
 J. S. Douglas...Maj. and Dir. Warehouses, American Red Cross  
 Francis Drake.....British Aircraft Production Department  
 A. S. Dwight.....Major, 11th Engineers, A. E. F.  
 Herbert C. Hoover.....U. S. Food Administrator  
 D. C. Jackling.....Dir., U. S. Explosives Plants  
 Donald M. Liddell.....Capt., Aviation Sec., Signal Corps  
 Halstead Lindsley.....Major, Ordnance Corps  
 Charles W. McMeekin.....Major, General Staff  
 C. H. Macnutt.....Lt. of Engineers in Canadian forces  
 W. W. Mein.....Assistant Secretary of Agriculture  
 J. W. Mercer.....American Red Cross  
 C. W. Merrill....Div. of Chemicals, U. S. Food Administration  
 H. G. Moulton.....Chief Examiner, War Finance Corp.  
 Seeley W. Mudd....Col. and Asst. Dir., U. S. Explosives Plants  
 O. B. Perry.....Lt. Col., 27th Engineers  
 Joseph Hyde Pratt.....Col., 105th Engineers, A. E. F.  
 A. L. Queneau.....Officer Interpreter, French Army  
 M. L. Requa.....Chief of Oil Div., U. S. Fuel Administration  
 Edgar Rickard.....U. S. Food Administration  
 A. P. Rogers.....Materials Dept., Signal Corps  
 W. L. Saunders.....Chairman, U. S. Naval Consulting Board  
 Millard K. Shaler.....Hon. Sec., Com. for Relief in Belgium  
 J. E. Spurr.....U. S. Shipping Board



H. H. Stout.....Lt. Col., Ordnance Corps  
S. A. Taylor.....Tech. Advisor, U. S. Fuel Administration  
Arthur L. Walker...Con. Met., Inspection Div., Ordnance Dept.

**DIED IN THE SERVICE OF THEIR COUNTRY.**

William Hague.....January 1, 1918  
J. D. Irving.....July 20, 1918

# Mining and Metallurgical Society *of America*



Bulletin Number One Hundred Thirty-two  
May 31, 1919  
Vol. XII, No. 5

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## OFFICERS FOR 1919

*President*, H. H. KNOX, 17 Madison Ave., New York.  
*Vice-President*, F. F. SHARPLESS, 17 Madison Ave., New York.  
*Secretary-Treasurer*, LOUIS D. HUNTOON, 115 Broadway, New York.  
*Executive Committee*, MESSRS. H. H. KNOX, LOUIS D. HUNTOON, W. R. INGALLS, R. A. F. PENROSE, JR., F. F. SHARPLESS.

## COUNCIL

At large, ex-officio,  
H. H. Knox, New York.....Retires January, 1920  
F. F. Sharpless, New York.....Retires January, 1920  
Louis D. Huntoon, New York.....Retires January, 1920

Districts 1-2-3-4, New York, New England, and Eastern Canada.  
W. R. Ingalls, New York.....Retires January, 1922  
J. V. N. Dorr, New York.....Retires January, 1921  
Pope Yeatman, New York.....Retires January, 1921  
W. Lindgren, Cambridge, Mass.....Retires January, 1920

District 5—Pennsylvania.  
R. A. F. Penrose, Jr., Philadelphia.....Retires January, 1920

District 6—Ohio, West Virginia, Maryland, Virginia, North Carolina, District of Columbia, and New Jersey.  
R. M. Catlin, Franklin, N. J.....Retires January, 1920

District 7—Minnesota, Wisconsin, Michigan, Iowa, Missouri, Arkansas, and Kansas.  
E. B. Kirby, St. Louis, Mo.....Retires January, 1920

District 8—Colorado, Utah, and South Dakota.  
R. C. Gemmell, Salt Lake City, Utah.....Retires January, 1921

Districts 9-10—Northern California, Nevada, and Alaska.  
Albert Burch, San Francisco, Calif.....Retires January, 1920  
F. W. Bradley, San Francisco, Calif.....Retires January, 1921

District 11—Southern California, Arizona and Texas.  
Ralph Arnold, Los Angeles, Calif.....Retires January, 1922

District 12—Washington, Idaho, Oregon, Montana, and Western Canada.  
C. W. Goodale, Butte, Mont.....Retires January, 1922

## OFFICERS OF SECTIONS

| SAN FRANCISCO       | NEW YORK              | PHILADELPHIA     |
|---------------------|-----------------------|------------------|
| Frank H. Probert,   | S. H. Ball,           | R. H. Sanders,   |
| <i>Chairman.</i>    | <i>Chairman.</i>      | <i>Chairman.</i> |
| Edwin Letts Oliver, | J. V. N. Dorr,        |                  |
| <i>Sec.-Treas.</i>  | <i>Vice-Chairman.</i> |                  |
|                     | F. F. Sharpless,      |                  |
|                     | <i>Sec.-Treas.</i>    |                  |

DOUGLAS, ARMITAGE & McCANN, New York, Counsel for the Society.



# Mining and Metallurgical Society of America

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Vol. XII, No. 5

May 31, 1919

Bul. 132

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## ANNOUNCEMENTS.

**Meeting of the Society.**—The special meeting of the Society called by the President to give further consideration to the proposed amendments to the by-laws was held on the afternoon of May 1, at the Columbia University Club, New York. The proceedings of this meeting are printed elsewhere in this issue.

**New York Section.**—A meeting of this Section, of which advance notice in the BULLETIN was not possible, was held on May 1, at the Columbia University Club. In view of the importance of the subject, this meeting also was devoted to the labor situation, which was first presented for discussion to the Section on April 3. Dr. Thomas Darlington, Messrs. J. M. Larkin and P. G. Beckett were the principal speakers. The meeting is fully reported on another page.

**Council.**—A meeting of the Council took place at the Columbia University Club immediately following the meeting of the Society held on the same date. The minutes of this meeting are published on page 193.

At this meeting, the Council decided that some formal action should be taken by the Society relative to the circumstances attending the death of Edward L. Dufourcq in Mexico. The Executive Committee was authorized to prepare fitting resolutions and these will presently be sent in ballot form for the vote of the members.

**Amendments to the By-Laws.**—According to the constitutional requirement, the proposed amendments to the by-laws, which have received consideration by two meetings of the Society, will shortly be submitted to a final vote of all the members. The polls will be open for 30 days only.

**Bolshevism.**—The mailing list of the Society has been placed at the disposal of Mr. C. R. Corning, who has undertaken to supply the membership with the reports of the Committee on Bol-

shevism of the Union League Club of New York as issued from time to time. As this is a subject which concerns every citizen and is of importance in its bearing on the policy of the Society, the Secretary takes this occasion to record his appreciation of the service which Mr. Corning is rendering by enlightening the mining public in respect of this sinister movement.

**Index and Title Page.**—The index for the 1918 BULLETIN, Vol. XI, will be published about July 1. Copies are sent to members only on request to the Secretary.

## COMMUNICATIONS.

**War Minerals Committee.**—This committee having reported to the Society that its labors had been completed, the Executive Committee, on April 3, voted unanimously that the thanks of the Council and of the Society be extended to William Young Westervelt, Chairman of the War Minerals Committee, "for his untiring efforts in behalf of the Government during the war as the representative of the M. and M. S. A. on this committee." Mr. Westervelt was, by the way, representative on this committee for the A. I. M. E., also.

Mr. Westervelt was duly notified of the action taken by the Executive Committee and under date of May 17 replied to the Secretary as follows:

Secretaries of  
American Institute of Mining Engineers,  
Mining and Metallurgical Society of America,  
New York City.

Dear Sirs:

Your esteemed favors transmitting my discharge as your representative on the War Minerals Committee have come duly to hand and the kind words of commendation contained are greatly appreciated.

Like other war committees, the War Minerals Committee's business in Washington was to meet an emergency as best it could, and as soon as the emergency had passed pressure of personal responsibilities immediately scattered the individual members. A detailed report of the Committee's work is therefore impossible.

But before the matter is closed I feel it incumbent on me to ask you to report to the Directors and the Council, and through them to the members of the Institute and of the Society, the inestimable value to our Committee of the unstinted support given by both your officers and members.

The instant response to all requests for funds was of the greatest assistance in getting started with office force, stationery, etc., and led later to a regular organization in the Bureau of Mines, working under a special appropriation, which is still doing good work as the War Minerals In-

vestigation under Dr. Spurr. The voluntary work of the special sulphur and manganese committees formed by the War Minerals Committee was of great value to the Government. Copies of private reports supplied were of much assistance. But the great service of engineers and geologists as a whole was rendered in connection with the passage of the War Minerals Bill by Congress.

Though every assistance possible was rendered by the Bureau of Mines and the Geological Survey, by the close of 1917 our Committee had about reached the limit of its usefulness in the way of stimulating the various Government executive committees, bureaus and departments to a realization of the country's need of preparation for domestic production of "war minerals" and had found that special Congressional action was imperative if the war was to continue for anything like the time then generally feared. This was necessary not only to insure a supply of war minerals but to make possible the appointment of some able mining administrator of large experience in the mineral industry who, with ample authority, could sit in the councils of Government and see to it that the ever-increasing autocratic powers the war was developing were used toward the mining industry so as to foster rather than crush the latter in its effort to produce sufficient raw material for war and essential civil requirements.

Our Committee accordingly prepared the War Minerals Bill but delay was at first experienced in introducing it on the floors of Congress. Once the Institute's endorsement of this Bill was realized in Washington however, the Bill was promptly introduced and when later the unqualified backing of the Society and the American Association of State Geologists was added, President Wilson's personal endorsement was soon secured and the passage of the Bill became assured though various forms of opposition managed to postpone final action until autumn, just before the signing of the Armistice.

The utility of the War Minerals Bill, and for that matter all of the activities of the War Mineral Committee which from the nature of mining necessarily dealt with needs years in advance, was then as abruptly terminated as that of the munitions, poison gas, government acid and other vast plants whose products would have eventually overwhelmed the German nation had the latter continued to fight. But who shall say that the solidarity of the Mining and Metallurgical Engineers and Geologists of the country, in so unitedly placing themselves behind the Government and preparing to provide mineral essentials well in advance of shortages, failed to add its quota to that sense of overwhelming power which, realized by the German spy system in this country and conveyed to German high command, made the latter realize the futility of further effort to hold back last autumn's great Allied drive and continue the war into another year.

Respectfully submitted,

WILLIAM YOUNG WESTERVELT,  
*Chairman.*

**Cuban Mines Bulletin.**—From Cuba has recently come "Boletín de Minas" No. 5, published under the Secretary of Agriculture, Commerce and Labor. It includes one article in English on the "Chrome and Manganese Ores in Cuba," the basis of which is apparently an unpublished report by Albert Burch to the Director of the U. S. Bureau of Mines.

**Albert Burch.**—In reply to an inquiry, Mr. Burch writes at some length with reference to Gelasio Caetani. It seems that due



to the loss by death of near relations, Capt. Caetani, who did such sterling work with the Italian engineering corps, has determined to settle down in his home country and devote his time to the management of his family affairs.

**W. R. Ingalls.**—This communication may be called a contribution to the subject of prices. There is a growing conviction that prices, which since the armistice have failed to come down generally, are going to remain at a high level for a long time. Intelligent opinion of that trend is best summarized in a recent letter by Otto H. Kahn, who is both a banker and a philosopher, to the Secretary of Labor. Mr. Kahn's letter follows:

Prices are determined in the main by the volume of production, of consumption, and, (probably more than by either of these) of the circulating medium, i. e., currency, bank credits, etc.

1. **Production.**—After the Civil War, the return of prices to the pre-war level, though it took thirteen years to accomplish, was immensely aided by the development of entirely novel methods of production in the shape of new forms of machinery and new kinds of business organizations. No one will seriously contend that the possibilities of the immediate future for increased efficiency or novel methods in production and distribution are likely to even to approach those which came between 1865 and 1890—a period which marked the transformation of our entire business structure from hand methods to machine methods, from "pound methods to tonnage methods."

2. **Consumption.**—In view of the vast destruction wrought by the war and now to be made good by reconstruction, and in view of the accumulation of the demand for many things which could not be supplied during the war, demand in many fundamental lines is bound to be large and urgent for some time to come.

3. **Circulating Medium.**—The credit expansion and currency inflation of the leading countries of the world, including our own, during the past five years has been on an entirely unprecedented scale. The process of contraction and deflation, to the extent that it is possible and likely to be approved by public opinion, will take many years.

The conclusion is inevitable that we have arrived at a new price level. This level in the early future may go somewhat lower, or it may go somewhat higher than at present prevailing, but it seems to me certain that there cannot be any immediate and radical recession. Those who hope for or fear materially lower prices will, I am convinced, have to wait a long time.

Going back to the roots of this question, those economists and bankers who believe in the quantity theory of money look for continued high prices. Those who repudiate the quantity theory expect a gradual decline in prices. In weighing opinions upon this question, let it be borne in mind that economists are very far from agreement respecting the relation between quantity of money and commodity prices. Some maintain that the quantity of money determines prices, but others deny it very vigorously. Those who talk about inflation of currency are essentially quantitativists. Thus, Mr. Kahn, though his practical experience causes him to give more weight to conditions of production and consumption of the commodities than do many mere theorists.

There is moreover a difference of opinion as to what constitutes inflation. When paper currency is put indiscriminately into circulation, as it has been in Russia, there is no doubt about there being inflation. Many economists and bankers speak about recent and present inflation in the United States. Other authorities deny that we have had any inflation, although we have had an expansion of currency corresponding with the needs for it.

It is important to recognize these differences in thought, which are fundamental.

Readers of my economic writings during the last 15 years know that I do not entertain the quantity theory of money; nor do I believe that during the war we have had inflation of the currency in this country. I find adequate explanation for the great rise in prices in the undeniable demand for military purposes and the scarcity of certain commodities. The inspiration to increase the supply of the scarce commodities thus having been given, effort was diverted from other kinds of production and thus the rise in prices extended gradually through the whole list of commodities.

There was hardly anything that rose more than ocean freight rates. It would be absurd to attribute that rise to increase in the quantity of money, or inflation of currency, or in fact to anything but scarcity of ships. When the demand upon shipping ceased to be so urgent freight rates fell. It would seem to be rather fatuous to argue that they are not likely to fall further, but on the contrary may even rise again.

There are at present two great factors, besides some subordinate ones, that are checking the decline in prices. These are the Governmental guarantee of the price for wheat in the United States and the idleness of millions of workers throughout the world, idleness that is due in part to necessity and in part to choice. Neither of these factors is economically auspicious, although the importance of the bountiful harvest of wheat that is promised is not to be minimized. Let us remember that there are still millions of men under arms. There are other millions in Europe who would like to work but can not for lack of some essential condition, such as disorganized transportation facilities. There are many men who do not want to work, or are unwilling to work except on their own terms, and in the meanwhile are being supported by Government doles. It is such factors as these that keep the price of coal so high in Great Britain and check the revival of industry there.

In the United States we have somewhat of the same labor conditions as in Europe but less extensive and less acute. Here, too, we have a peculiar agricultural condition, that we must view with mixed feelings. The immense crop of wheat that is presently to be harvested is a godsend to the world in point of quantity, but that it must be paid for at a stupendously high price, guaranteed by the Government, is a misfortune to the American consumer. The farmers, adding to their wealth at the expense of the rest of the people, become profligate purchasers of luxuries. Thus we see the money drawn by taxation from the East transferred to the West to farmers who are paying \$5 to \$6 per day for harvest hands and who are spending their profits for automobiles. We see the motor-car manufacturers experiencing such a boom as never before. We see a boom in petroleum production because coal is so dear abroad. On the other hand we see this country suffering from lack of sufficient housing and from inadequate transportation facilities, even the existing plant having fallen into desperate condition. An extensive shipbuilding program is still being carried out, but as for constructive work with a view to increasing and cheapening production, such as the development of water power, the electrification of railways, etc., nothing is being done, nor will be at present level of prices for commodities and labor. The vicious circle of reasoning that prices can not come down because labor will not, and that labor will not because prices do not, is bound to have a break.

One of the first aftermaths of peace may be a period of fictitious prosperity, but I feel quite sure that we are not going to get our real bearings until all the people of the civilized world get to work, until all governmental interference with industry is removed, and until this year's harvest



of wheat is liquidated. Eventually I look for prices to fall below the pre-war levels for causes growing out of the impoverishment of the world. I can not conceive the suffering of such a calamity as the war and any substantial prosperity coming out of it. The only prosperity that we can confidently foresee is what will come from hard work. But, as I have said before, I am not a quantitativist, nor do I believe that we have inflation of currency in this country.

**Newton B. Knox.**—The Secretary's office has received a letter from Mr. Knox, who is in charge of the Minas de Phoenicia at Noya, Spain. In view of the fact that no word has come from him for many months, the following excerpt from his letter will be of interest to the members:

I have been here on this mine for three years now trying to get a 150-ton mill started under war time conditions. I am on the eve now of starting up and will have the finest mill on the continent. I am running a small 40-ton mill at present and also have built a tin smelter and am smelting my tin. If ever I do return to the land of lands (New York) I'll have something to say of my "Great Adventure in Tin Smelting." You know I have lived abroad since 1900 and am I fear sadly out of touch with the men I used to know.

**F. F. Sharpless.**—The world war and its effects have brought to the attention of the American public a state of affairs, which, though known to many engineers, was not generally appreciated in its full significance.

The situation to which I refer, now very familiar to all of us, results from the fact that the development of our natural resources has not been carried to a point where we can depend upon domestic supplies of numerous minerals sufficient for home consumption under all circumstances.

The so-called "war minerals" gave the authorities considerable concern for several months and we were forcibly reminded that preparedness covered not only men and munitions but the raw materials from which the latter were manufactured.

What is going to be the position of the war minerals in our domestic economy, now that the war is over? What should be done in respect of magnesite, chromite, manganese, tungsten, potash, mercury, graphite and all the other minerals whose production was actively fostered during a few short months?

Are the miners of these ores to be protected by a high tariff, their investments conserved and their industries encouraged?

Are we to admit all of these substances free of duties from countries where they can be produced at least cost, thus encouraging manufacture and consumption, but closing down our own mines permanently?

Or are we to look at the problem from still another angle and endeavor to put these industries in such a position that in the event of foreign supplies being unexpectedly cut off, domestic resources will quickly respond to any demands made upon them?

An intelligent answer to these questions can only be given when the condition of each mineral industry, at home and abroad, is thoroughly understood by those who will determine the general or particular policy to be adopted.

Among the members of the Mining and Metallurgical Society are many who have devoted special study to one or more of these minerals.



They know what the country can produce under stress and they know its limitations. They know the extent of development and what has been invested in plant and equipment. They know the trade demands under normal and war conditions. They know the foreign sources and costs of production.

The President of the Society has appointed a number of committees with the idea among other things of having each committee familiarize itself with its special mineral or metal if not already possessed of all important information available, so that later it may be in a position, through the Society, to furnish well digested opinions on questions having to do with the metal or mineral industry.

There is already a specific case confronting us. Already we hear mutterings of representations that will be made to the next Congress by producers and consumers. If they get an opportunity they will undoubtedly insist on some definite action and in the interest of the Nation this body should take very positive action at an early date.

We do not know when we shall be called upon, but it is the duty of all of us who have definite data and valuable opinions to put these before the Society, either in the form of letters to the Secretary or to the committees having the subject in charge or simply as a communication to the BULLETIN.

The fact that committees have been appointed does not relieve other members of the duty of lending their individual aid through the medium of the Society.

Even before Congress has assembled we read of the effort that will be made at its next session to shut out German fertilizers and further to foster a rising industry in this country. How many members has the Mining and Metallurgical Society who know anything about the potash industry, to what extent it has been developed in this country, and at what cost? Is there promise of being able to satisfy our domestic demands? Or just what is the situation? What would those members who are reasonably well informed on the industry recommend in the way of legislation if any? The same questions may be asked respecting every one of the other war minerals.

Once again the old question comes up: "What can I get out of my membership in the Mining and Metallurgical Society?" And once again we have the answer: "You cannot get very much out of it." But here is a splendid opportunity to put something into it and to make a valuable contribution to the industry and to the Nation through the Society.

## OTHER SOCIETIES.

### ENGINEERING COUNCIL.

**Chicago Conference.**—Shortly after the appointment of J. Parke Channing as the delegate of the Society to the Chicago Conference of Engineering Societies, on April 23, 24 and 25, the Secretary received a prospectus and other literature from the National Service Committee of the Engineering Council relating to the matters which were to be discussed.

As has already been announced this conference was called primarily to give consideration to the desirability of establishing a Federal Department of Public Works. The prospectus was in the nature of a questionnaire and the societies which were to take part in the conference were requested to reply to the prospectus in advance in order that the business of the conference might be transacted expeditiously.

But, the prospectus proved to be a rather formidable document and covered subjects other than that of a Department of Public Works, and unfortunately it was impracticable for the Council of the Society to take action in the time at hand before the conference. Thus, as the next best thing, the President requested those members of the Society in Washington who were most familiar with the conduct of Government business to review the prospectus and to state their opinions by letter. Some of these members, because of their official positions, did not respond but below are printed the replies received from Messrs. Spurr and Bain, dated April 19 and 23, respectively.

I have yours of April 14 covering the question of the establishment of a Federal Department of Public Works.

I have read the printed questionnaire and given the matter some thought and discussion.

In brief, I am not in hearty sympathy with the movement for the establishment of a Federal Department of Public Works. It is evident to those of us who are familiar with the machinery of the Executive Departments in Washington that a great amount of change and reform is desirable if the executive branch of the Government is to be effective as business men and engineers define that term. There is a great deal of duplication in different departments and even in the different bureaus of the same department. There is a great deal of lack of information among the departments and bureaus as to the nature of the work which is going on in other organizations. There is also a great deal of elbowing and competition between different departments and bureaus as to how ground shall be covered in which different departments or bureaus have a common interest. Much has depended in the past upon the enterprise or aggressiveness of different departments or bureaus, or of the men at their head, as to how far they extend and how far their activities ramify. While this is true of the whole executive machinery, it was strikingly true of the War Boards, some of which I have sometimes jokingly likened to privateers launched upon the official seas of Washington with charters which enabled them to seize and tow into port any other official craft which they could overcome.

It was doubtless from a sense of this lack of coordination and efficiency, realized more than ever during the stress of war, that the Overman Bill was passed, giving the President authority to rearrange the work of the various bureaus and departments, taking from one and giving to the other in the interests of efficiency. However, very little was done under this authority.

If such a power as contained in the above mentioned Bill were to be vigorously applied and retained, I believe that the root of the confusion



and relative inefficiency, and lack of co-ordination of all Government Departments would be struck at. In other words, the great trouble with the executive machinery at Washington as a business organization, is that it has no head. Nominally the President is the head, but, of course, he has no time to cover the business side of the Washington organization, his time being taken up with matters of statesmanship. The same holds true of the Secretaries in charge of the different departments who are mainly occupied with broad problems of the same character. If we may presume to reason from an analogy between the business organization at Washington and large private business organizations, I should say that what is needed would be an Assistant to the President who should be, in effect, a business manager who should have charge of the proper co-ordination of the executive machinery and that similarly each of the Secretaries should have a special Assistant Secretary who should be a business manager of his department and who should report, not only to the Secretary, but to the general business manager who should be the Assistant to the President. As an example, which concerns our own profession, the Bureau of Mines and the Geological Survey represent the mining industry in the Government at Washington. Both are in the Interior Department and the necessity for co-ordination is very great, but the Bureau of Mines is in charge of one Assistant Secretary, and the Geological Survey of another.

In this connection, I must say that, considering the great handicap of the lack of central business control, the different bureaus of the Government have, during the war and subsequently, done a great deal in the way of voluntary co-ordination and co-operation, and I think they have gone about as far as they can independently.

Now I think that the establishment of a Department of Public Works to bring together all or many of the bureaus designated in your No. 7 in the questionnaire, would not remedy the situation as above stated, and I take it that this situation, which is generally recognized by students of our Government, is the main argument advanced for the new Department.

On the contrary, I believe it would make the matter worse, because it would be a grouping less logical than the present. To bring together, for example, the Public Health Service, the Construction Division of the Army, Indian Affairs, the Bureau of Mines, the Forest Service, and the Bureau of Lighthouses, in one single new Department to be created, is without any logical reason that I can discern, except the rather nebulous reason that all are partially technical. It cannot even be said that these are all engineering activities.

The argument is, I believe, advanced that this would give an opportunity for the engineering profession to take the share in the Government to which it has a right, and that an engineer would be logically at the head of this new Department, and therefore represented in the President's Cabinet. I do not think that this conception is justified. The activities contemplated under the new Department are so diverse that anyone selected to head the Department could have a personal knowledge and fitness for only one out of these many branches. The result would most assuredly be that this Cabinet Officer would be selected, as usual, for his administrative ability, and in part for his political prominence, and might be an engineer or not. If you will look into the appointments of the heads of the various technical bureaus at present you will find that even these, which are highly specialized as to their functions, are often headed by men chosen for their administrative ability rather than their technical familiarity with the work of the bureau.



Furthermore, I believe that the general idea of grouping all these activities together as technological is a false one and that the true grouping is from the standpoint of industries and interests involved, regardless of the technological methods or tools involved in serving these industries or interests.

For example, in our profession I feel that the inclusion of the Bureau of Mines and the Geological Survey in such a Department would be distinctly a step backward. My conception of these organizations is that they represent the mineral industry, lock, stock and barrel, and that the key to their ideal organization and range of activities is economic and industrial, rather than technologic. I may argue this point by analogy with the organization of a large mining enterprise, the main idea in which is economic and industrial, and in which the engineering and technical work constitute devices working toward the main purpose. No one would think of putting in charge of a great industrial enterprise such as a large mining organization, a man simply because of his technical ability; affairs must be administered on a business basis and the man who can produce the largest amount of ore and metal most efficiently and cheaply, will be the man chosen. The factors which he has to consider will be not only the engineering or technical factor, but also questions of transportation, marketing, and the national and international situation, both economic and political, as regards the metals in which he deals; and this broad industrial viewpoint, which will be necessary to this head of a great mining business is, I think, the proper viewpoint for the Government Bureau or Bureaus which represent the national mining industry. As a matter of fact, in my opinion, the greatest improvement that can be brought about by mining engineers in the Government representation of their industry is to substitute for the hitherto too prevalent conception that the Bureau of Mines, for example, is a purely technologic Bureau, the new conception, which is now I think imperatively necessary for the good of the country, that the mining industry has or must have a bureau, bureaus, or a department in Washington which represents it as an industry in the broadest and most sympathetic and intelligent sense.

The engineer, like the farmer or the laborer, will be in the future represented in the Government at Washington in proportion to his individual ability. We have seen in the person of Mr. Hoover, a member of our profession become one of the most powerful factors in the Government, not because he was an engineer, but because he has administrative ability.

I hope that the above letter will answer your query in a way. I note various further problems submitted in the questionnaire which I will not touch upon. I note in passing, however, question 10, as to the question of a Department of Transportation and whether it should be an independent Department or included in the proposed Department of Public Works. Without knowing what the writer of the questionnaire means by the Department of Transportation, the title suggests a more definite conception as covering a certain group of industries or interests, and therefore creates a more favorable reaction than the conception of a Department of Public Works, which latter recalls Carlyle's "Professor of Things in General." The question arises as to whether the proposed Department of Transportation would cover the railroad problem, as well as the street railway problem, the shipping problem, the canal problem, and the highway problem among others. If so, surely this is a large enough infant to stand by itself and should not be included in the administration of the hypothetical omniscient engineer who is to head the Department of Public Works.

Yours very truly,

J. E. SPURR.

I am sorry that, owing to my absence from the city, your letter of April 18, relative to the Conference of Engineering Societies, was slow in reaching me.

I telegraphed to Mr. Channing at Chicago today to the effect that the sentiment among professional men here is favorable to the formation of a Department of Public Works, and that it should include most of the Bureaus listed in the circular. The feeling seems to be that it would be possible to create a Bureau of this sort by readjustment of duties without adding a new member, and that it would be well to bring the Bureaus together and let real organization take place as opportunity serves. My own impression is that a Department of Transportation is not called for unless the Government continues to hold the railroads.

Cordially yours,

H. FOSTER BAIN.

Under date of April 30 Mr. Channing made his report as delegate of the Society and sent forward a copy of the "Digest of Proceedings" of the Conference of Engineering Societies. Although other matters are also covered by this digest, for the moment at least it will suffice to print only that part of the conference proceedings which concerns the proposed creation of a Federal Department of Public Works. Taking the headings into consideration it is believed that what follows will be self-explanatory:

REPORT OF COMMITTEE ON GOVERNMENT ENGINEERING  
ACTIVITIES ON THE SCOPE OF A DEPARTMENT OF  
PUBLIC WORKS.

(Unanimously adopted.)

To the Chairman and Members of the Conference:

Your Committee charged with a consideration of the question which Government activities should be co-ordinated in a National Department of Public Works, recommends:

1. That the establishment of a National Department of Public Works should be accomplished by grouping those Government bureaus, services, commissions, and other activities whose functions are predominantly of an engineering or architectural character, in what is now the Department of the Interior and thereafter designating that Department "The Department of Public Works."

2. That the transfer of any bureau, service or commission from any other Department to a Department of Public Works should be accomplished without change of personnel, compensation and general plan of organization, leaving the co-ordination of the several activities, the simplification of organization and the establishment of additional bureaus such for example as a Bureau of Chemical Engineering, to be effected as the need for the same may from time to time become apparent.

3. That in transferring river and harbor work and other work non-military in character, but now in charge of the Engineer Corps of the United States Army, to a Department of Public Works, the relation of the Army engineers to such work be not changed and that there should be

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no relinquishment of non-military duty by the Army engineers now on such duty until transfer of these Engineers to Military Duty can be made without detriment to the public interests.

Your Committee finds that among the bureaus, services and activities, which logically belong to a Department of Public Works, are the following:

- A Bureau of Public Roads.
- The United States Reclamation Service.
- The Alaskan Engineering Commission.
- The Construction Division of the U. S. Army.
- A Bureau of River, Harbor and Canal Work, including such functions as are now exercised by the Mississippi River Commission and the California Debris Commission.
- A Bureau of Architecture.
- A Bureau of Surveys, including the Coast and Geodetic Survey.
- A Bureau of Mines.
- The Geological Survey.
- The Forest Service—at least until the same is divorced from the supervision of water powers and road building.
- The Bureau of Standards.

Your Committee believes that it would be unwise to determine at this time to what extent the proposed Department of Public Works should control the engineering activities of the General Land Office; of the National Park Service; of the Bureau of Lighthouses; of the Bureau of Indian Affairs; and of the Public Health Service and of various commissions, such as Commissions on buildings and grounds, and therefore suggests that such matters may well be deferred for consideration to a later date, preferably until the Department has been organized.

C. E. GRUNSKY,  
J. PARKE CHANNING,  
JAMES H. HERRON,  
IRVING K. POND,  
BAXTER L. BROWN,  
P. JUNKERSFELD,  
FREDERICK K. COPELAND,  
W. O. HOTCHKISS.

### MAIN RESOLUTION ON THE ESTABLISHMENT OF A NATIONAL DEPARTMENT OF PUBLIC WORKS.

(Unanimously adopted.)

This conference of the delegates from engineering and related organizations respectfully recommends to the public and to the Congress, that legislation be enacted covering the following principles:

1. That the services and bureaus of the National Government having to do chiefly with matters of engineering and architecture, be grouped in one department to be known as the Department of Public Works.
2. That the Department of Public Works comprise those works which are built and operated for the use of the Public.
3. That the Department of Public Works be made available when desirable for the performance of special engineering and architectural work for the use of other Government bureaus.
4. That there be a systematic classification and organization of engineers, architects and other employees whose status shall be such that they may be recruited and maintained on merit.



Another resolution adopted by the conference was to the effect that, in order to further the creation of a Department of Public Works, the Engineers, Architects and Constructors Conference on National Public Works should continue in existence indefinitely. Furthermore, certain committees to have this special matter in charge were appointed, and one of these is to be known as the Committee on Text of Bill.

In order that the members of the Society may form an opinion as to the importance of the conference, it may be stated that, according to the digest, 71 delegates representing 74 organizations attended and that these organizations in turn have a total membership in excess of 105,000. It may be supposed however that duplication of membership has not been taken into account.

One division of the digest gives the information that, after editing, the full stenographic report of the conference will be available.

## MEETING OF THE SOCIETY.

May 1, 1919.

A special meeting of the Mining and Metallurgical Society, of which the required notice of 30 days was given, was held at the Columbia University Club, New York, on May 1, to give further consideration to the proposed amendments to the by-laws of the Society, which were considered and passed at the annual meeting of the Society, January 14, 1919.

The meeting was opened at 5:10 p. m. with the President, H. H. Knox, in the chair. The following members were present: J. V. N. Dorr, W. R. Ingalls, E. B. Kirby, F. F. Sharpless and Pope Yeatman. Other members being represented by proxy, the acting secretary reported that there was a quorum and the president so announced.

The secretary reported that the proposed amendments had been published in the BULLETIN of the Society dated January 31, 1919, and that no objection had been received from any member.

Upon motion, duly seconded, and unanimously carried, it was voted "That the proposed amendments to the by-laws should stand approved as presented in BULLETIN No. 128 (January 31, 1919)."

The meeting thereupon adjourned at 5:20 p. m.

EDWARD B. STURGIS,  
*Acting Secretary.*

## MEETINGS OF SECTIONS.

### NEW YORK SECTION.

Meeting of May 1, 1919.

A meeting of the New York Section took place at the Columbia University Club on the evening of Thursday, May 1. The usual dinner preceded the formal business of the evening.

In accordance with the official announcement, the subject for the evening covered certain phases of the labor situation. The discussion of this general subject, as a part of the Reconstruction program of the Section, was opened at the April meeting, and as the question of labor is so extensive still other meetings devoted to it will probably follow.

Mr. Benjamin F. Tillson, who presided, introduced Dr. Thomas Darlington as the first speaker and he was followed in turn by Mr. J. M. Larkin and Mr. P. G. Beckett. The remarks of these gentlemen were of the deepest interest and were followed with the closest attention by those present.

The members attending follow: L. Addicks, J. H. Allen, C. W. Boise, J. A. Church, Jr., A. E. Drucker, E. F. Eurich, L. C. Graton, W. R. Ingalls, A. F. Keene, E. B. Kirby, H. H. Knox, F. R. Pyne, E. Rickard, A. H. Rogers, F. F. Sharpless, W. A. Smith, A. M. Smoot, B. F. Tillson, G. D. Van Arsdale, W. Y. Westervelt, L. A. Wright and G. J. Young. In addition to the three speakers of the evening the following guests were present: W. Burns, E. H. Dawson, D. B. Doyle, F. S. Keeler, M. R. Lamb and René de Sallier.

**The Chairman.**—I presume that the members and guests will be inclined to feel defrauded this evening, as it was understood that Mr. Stone was to preside. I suppose that when your committee on arrangements planned to have a gem Stone and couldn't get one it thought that it would have to take a poor specimen of Franklinite to help them out in the emergency. I am sure that you will bear with your Chairman for this meeting, however, because of the excellent quality of the speakers and the subjects which they have to present to you tonight.

We are in the series of our meetings on labor and reconstruction, and tonight we may consider some of the phases which have to do with the efficiency of labor, in view of the fact that we are considering the economics of the labor aspects. One may say that there are eight things responsible for inefficiency of labor in plants. First, power failures; second, failures and limitations of equipment and repairs; third, a lack of instruction to the employees; fourth, a lack of training; fifth, failure in supply-

ing material; sixth, personal slacking; seventh, proper working conditions for the health and welfare of the employe; and eighth, a proper co-operation between the executive organization and the employes themselves. The experience in some factories, where tests have been made, indicated that of the first six causes of inefficiency which I have mentioned the first five of them were entirely responsible for a reduction in possible efficiency to about 35 per cent. of that which might well have been produced. These figures were taken in a factory which is known as an efficient plant as plants go. The department that was analyzed (26 men being taken) was considered as good a department as there was in that plant and yet it was ultimately agreed upon that they were getting three hours of labor out of nine hours of work which might have been obtained if the men hadn't been interfered with by one of these factors of inefficiency, chiefly supplies, material, power and keeping the machines going and the men busy.

Now, our first speaker tonight you all know very well. Dr. Thomas Darlington is known for his work along this and other lines, both as Commissioner of Health in New York and in his many other activities as for instance at Hog Island during the war and more lately in his connection with the American Iron and Steel Institute. He will give us an idea of the relation of fatigue to welfare of the employe and thus show us how one of these eight conditions may be improved. Dr. Darlington. (Applause.)

**Dr. Darlington.**—I understand that it is a rather difficult thing to become a member of this Society and to tell you the truth I rather like that. I belong to a great many societies, probably like yourselves, one or two that are best illustrated by a story.

You know how the automobiles go up and down the Avenue, up on one side and down on the other and one car following another. A great big limousine ahead, a little machine behind, got up to 37th Street. The policeman pulls the lever, the big machine stops and the little car bangs into the back of it, and the policeman goes to the driver of the little car, pulls out a summons book and says, "What's your name?" "Casey." "What is the first name?" "Patrick." "You an American citizen?" "Yes, sir." "Born in this country?" "No, sir." "Where were you born?" "Ireland." "What part of Ireland were you born in?" "Limerick." "Are you one of the Caseys of Limerick? Now, you hold your machine right here, don't you move from the spot until I go to that big machine in front and see what that big mutt meant by backing down into you." (Laughter.) Well, that illustrates the clannishness and exclusive quality of your



Society. I am very glad to meet you all tonight, gentlemen, and very glad to have this opportunity to talk with you. It is always a very great honor to talk to men of such a class and I consider it an honor to be invited to come here tonight. As your Chairman has already stated, what I want to talk about is man as a machine.

As there is another speaker I don't want to take up all the time. I remember the first time I ever gave a talk. I was to talk on the subject of temperance, something I didn't know much about and something in these latter days I don't believe there is as much need of as I used to (Laughter). However I was told to talk about 40 minutes, as long as the old Presbyterian sermons I used to listen to, and I put down 56 headings to talk from, and when I finished two hours and twenty minutes had gone by and half the audience had gone out and got intoxicated and the other half said that if they ever again had to listen to a speech like that they'd never drink as long as they lived. It beat an amendment to the constitution as far as prohibition is concerned.

We have come a long ways in the last 40 years. I go back to when I first commenced the practice of medicine, and I am in my 40th year of practice. The death rate in this city when I had an office down in West Thirtieth Street was 35 per thousand, nearly 36. Now, it is only a little over 13. Wonderful have been the discoveries in medicine, just as wonderful in medicine and prevention of disease as all the other discoveries that have come along in the last 50 years; the great wonders in electricity, means of locomotion, everything that we have today. Likewise medicine has opened a new field, particularly in prevention of disease and we have commenced to consider man in a different light. We know and have known for a long time, that it pays to take care of an accident. Compensation laws have been enacted and we know that it costs something every time a man loses his finger. It used to be, even 10 years ago, that in some of the steel plants when men became injured the wound would become septic in fully 50 per cent. of the cases, 500 out of a thousand. Today in various steel plants, the United States Steel Corporation, Carnegie, Cambria, Youngstown Sheet & Tube, only one out of a thousand, and in the Bethlehem Steel very much less than that. In the big plant at South Bethlehem in four years of accidents, taking every little thing into consideration, every little scratch, 50 or 60 cases a day, there have been only two cases of septicaemia.

Now we have come to another time when we find it pays to take care of the human machine to even a greater degree and in

other ways. The deaths in the army both from disease and those killed in battle are nothing compared to those who become ill and die in industry. Man is a machine. How is he usually cared for? Let me give you an illustration. Here is a man who has made his pile. He goes home and says, "Wife, we have made a million. I have sold out the plant, we are never going to work any more, you and I, we are going to get a Rolls-Royce and we are going to motor out to California. We are going to run the motor slowly across the country and will see everything, and we are going to take our ease the rest of our life, but you know, of course, we will come to places where we will find it very difficult to get water and in other places we may not always get oil, especially when we cross the desert, so I'll tell you what we will do. We will take the machine out next week and take it out two weeks without water and we will take it out two weeks without any oil and we will make it as "hard as nails." Rot, isn't it? That is something like the case that a soldier in the army is supposed to be given. I have just come out of the army and I know something about it, having the contagious diseases of fifty thousand men to look after, and it is the same care that is often given to men in industry. We treat him just like that man treated his machine. We think that hardship hardens a man and we look at the brown faces of the men that have come from abroad and say they are "hard as nails," but I am thinking of all those that went down, of many deaths, for which there seemed to me to be no necessity. Given a well man and you have absolute control of him. Why should he get ill?

From my standpoint efficiency depends primarily on health. The German philosopher, Münsterberg, said it depends on a man's psychology, but what does psychology depend upon? Flow of blood to the brain, and flow of blood to the brain varies with all kinds of things, with the weather, the pressure of the barometer. Suppose your liver is out of order. Don't things look with a green and yellow hue? If you don't think psychology changes, let a man try six of these (indicating a cocktail) and see whether his psychology changes. Instead of feeling poor, you own the world. Psychology depends on health. Efficiency depends on health, and it pays to take care of a workman.

As a matter of fact, illness in industry already has an effect on operating costs that is far from being realized. Whenever a man is absent from his work because of illness, it is usually necessary to have someone else take his place. The substitute, as a rule, is a less efficient worker; he makes a smaller output for the day's wages, he spoils more raw material, he requires more

supervision from the foreman, who is thus distracted from more important work, while procuring and sending the substitute to the work needed involves a cost and usually a delay in the operations. I have seen a business fail because it depended on one man, the superintendent, and he got typhoid fever and there wasn't anybody to run the business.

Efficiency depends on health, and health depends on three things, the care that a man gives himself, the care that industry gives him, and the making and enforcing of health laws, city, state and national. What can people do for themselves? Before I take up that question I have been told that some of the members here are interested particularly in the question of fatigue. I happen to be Chairman of the Committee of Fatigue of the Council of National Defense and I want to talk to you about how people get tired. Fatigue means much to a worker. If a person catches cold it is when he's tired, if you catch an infectious disease it is when you're tired. Fatigue lessens resistance to disease. Fatigue is the one great thing in this world that we want to avoid. What makes people tired? Work? No. Very seldom. It isn't work. Cold will make you tired. It makes every cell in the body work fast. A great many things make fatigue, but seldom work. That is a different idea from that which most workmen have.

I once ran for a political office in this town—I was defeated—Borough President. While I was campaigning at that time, standing on a soap box, I heard a man say, "My friends, the time is coming"—this was down on the East Side—"the time is coming when we are going to have a three-hour day." Think of it, a three-hour day, because they believe, like all the Bolsheviks, that work is the curse of the earth. That isn't true. How do people get tired. Now, to know that you have got to understand a little physiology. We must understand the body. Every part of the body is in motion all the time. When any part isn't in motion in the body it is dead. You are manufacturing heat, you are getting energy all the time. That comes from your food. Food goes into the body, is taken up and stored in the body, and you have it to use. It is then burned up by means of the oxygen which you breathe. All the time in the body there is a breaking down process, all the time there is a building up process.

I move my arm like this (illustrating by bringing the forearm up). What has happened? The will sent an impulse into this muscle, the biceps, that is attached to the arm. It contracts. As the muscle contracts up goes the arm, but I have used up some energy in this muscle. Energy comes from something.



What is it? Something in the muscle— $C_6H_{12}O_6$ . What is that? Dextrose. The  $C_6H_{12}O_6$  becomes  $2(C_3H_6O_3)$ . What is that? Lactic acid. If I keep on doing that pretty soon that muscle gets sour—tired. What becomes of the lactic acid? Burns with the oxygen, finally comes out  $CO_2$  and  $H_2O$ , and goes out through the lungs and the kidneys. Very simple, isn't it?

First we use up all the sugar. All the starches go into sugar. We store that in the liver. That is the coal bin. Then when you have used up all the sugar, you use up the fats. That is very much more complicated. After you use the fat in the muscle you use the muscle itself. How do people get tired? We will suppose they have no sugar in the muscle. Well, then, you haven't anything to work with, have you? Then you are tired. It is a great deal like the energy developed in a boiler. You have got to have the coal. What a difference whether you get slaty coal or whether you get Pocahontas. A wonderful difference, isn't there! The next thing necessary is a draft. If there is no draft it doesn't burn well. And the next thing is to get rid of the ashes of waste.

Energy depends first upon the food you eat, the kind of food, whether the system can use it or not, whether you digest it and store it away. Next upon the oxygen which is carried by the red blood corpuscles, the hemoglobin in the blood. The first thing then in the question of fatigue depends upon the character of the food that people eat. Very few people understand that, and so far as the workman is concerned very few of them or their wives know anything about feeding the man and any old thing goes in the lunch bucket. One day I opened two hundred and fifty lunch boxes in a Carnegie Steel plant. The first bucket opened contained a whole boiled cabbage. How much  $C_6H_{12}O_6$  did he get to use in the muscle, how much energy could he develop from that cabbage? It was good for one thing. Perhaps I will tell you a little about that later. The next man had nothing but cake and honey. He got all the  $C_6H_{12}O_6$ , but what did he get to make up for the loss of protein and muscle? Nothing, and he was thin.

But it is not alone a question of the kind of food that he gets. Does the man digest that food? Was it mingled with bacteria in the mouth and fermented in the stomach? Did the sugar split up into acids in the stomach before it got into the muscle? Don't you see that energy is the converse of fatigue and fatigue the converse of energy? Energy depends first upon food and its digestion, its absorption and utilization and next how are you going to burn it? It is burned with the oxygen. Take a drop of blood from a man and examine it under the

microscope and we find that he has a five million blood count. Yes, that is a good healthy man. It is up to normal. The next man we take we find he has two million five hundred thousand blood count. Doesn't it take twice as rapid the circulation of the two million five hundred thousand to carry the hemoglobin as the man with the five million? Yes, twice as fast the blood has to work because he has anaemia. What does anaemia come from? Dark, unventilated rooms, infectious disease, poor food, lack of movement from the bowels, bacteria in the mouth, in the tonsils.

Next getting rid of the ashes of waste, and how do we do it? The waste is all through the body.

There was an old professor in Turin who watched quails migrating across the Mediterranean; some of these he caught that were very tired after they flew across the ocean and he picked them up. They were too tired to prevent his picking them up. He took them home. Next year he caught some more and he took the tired quails and took the blood out of them and put some of this blood into the quails that weren't tired that he caught the year before and it made them tired.

How do you get rid of this waste? Well, the blood takes it up and takes it away. If a person drinks a great deal of water that helps. If you have a shower bath you drive the blood inside and then it returns to the surface again and that helps and soon you get rid of all fatigue and the waste goes out through the kidneys. But other waste produces fatigue. Sometimes a person does not have a regular movement from the bowels, because instead of having modern water closets you find places that you couldn't dignify as even privies—simply an old bar. One man made them as bad as he could. Why? He didn't want the men to linger there. Well, he lost lots of money and I will show you how. In fermentation we have bacteria in the bowels all the time. In fermentation, particularly of protein food, you develop certain poisons. These poisons are known as indol, skatol, mercaptan and certain phenols. The last develop particularly from eggs and milk. The most common poison found is indol. That is absorbed and becomes a sulphate in the system and that is known as indican. When you have a urine examination you see so much sugar, so much albumen and so much indican. The sulphate of indol is indican.

To show you how it works and how a lack of movement of the bowels produces fatigue, a man gets up in the morning and he hurries, he hasn't quite time to have a movement at that moment. He goes to work, doesn't go outside, he has got a lot

to do, and the little amount of liquid material around the movement in the lower part of the bowels is absorbed and the desire to have a movement passes off. What has happened? Let's see for a minute. (Draws sketch on blackboard.) This is a stand. This is a cylinder which is smoked. Here is a short arm fixed. Here is a long arm on a pivot. We put in here a muscle, the back of a frog's leg, called the gastrocnemius muscle. We now put an interrupted current in here and the smoked cylinder is timed to revolve as you put an interrupted current through. The muscle contracts. That pulls up this arm so that on the cylinder you get a record. We take a muscle and into this muscle we put a few drops of salt and water with a hypodermic syringe and take the record. Now, if we can get two muscles from the back of a frog's leg, get them out just exactly the same, and we want to see the difference in the muscles we take the first one with an injection of a little salt and water and this is the record that we get of that muscle (illustrates on blackboard), taking about every fifth mark and finally the muscle stops contracting; it won't go any longer; it is all used up; it is dead. Now, we will take a little indol from a movement, a fraction of a drop, and this time put that in with the salt and water and inject that into the other muscle. What do we get? (Illustrates on blackboard.) The muscle stops work a little more than one-third of the time. That is the man's lifting capacity. The man who hasn't had a movement of his bowels in the morning, absorbs that material through his system. The man has only about a little more than one-third the efficiency of the other man so far as his actual muscular capacity is concerned. If the one man is worth \$6 a day this man is worth \$2.30. That is putting a movement of the bowels into dollars and cents. (Laughter.)

Don't you see that fatigue doesn't depend entirely upon the amount of work that a man does? It depends first upon the energy from food and second if he has plenty of red blood circulating in order to carry the oxygen to the tissues. So much that when he gets up in the morning he puts up his hands to Heaven and says, "Thank God, there is another day to work." He works well because he has the energy, and he loves it.

Once when I explained this to some of the steel people, I said that if I was building a steel mill or any other kind of a mill the first thing I would do would be to build a marble water closet so as to get everybody to go in. (Laughter.) So one of the steel men did that and all the Italians went in there and ate their lunch. (Laughter.) You see, there are some other points which you must consider besides the mere health of the men. Once in a while there comes a slip.



About the efficiency of the man himself, don't you see it goes into every phase of that man's life?

Before the war we were just approaching these things. Back in the Old Testament it tells about the Jews when Nebuchadnezzar was outside of the walls and had his great army there and his banners and they all gave up everything they were doing that they didn't think was just right. And some said "What about these slaves of ours?" and they freed them all. But one day they saw the banners of Nebuchadnezzar in the early morning disappearing in the far distance and when the danger was past they said, "Where are those slaves of ours?" and again they made them slaves.

While the war was on it was our winter and the leaves were off the trees and we could see a long distance. We must continue to see that long distance. We can't go back to our ante-bellum days. We have got to go forward. We have had a vision of what is right and we can no longer go back, but must do everything that we can for those who are ignorant and less favored by birth in station of life.

Let us now take up one or two other things. I said that a man's efficiency depends upon what he can do for himself. Now, among the many things of personal hygiene besides the question of taking baths, care of the eye, the ear and the nose and everything else of that kind, and regulation of a man's meals, there are simple things like the brushing of teeth. How many workmen in the factory brush their teeth every day? To be efficient men they must brush their teeth seven times a day. Do you suppose any of your workmen know that? Not a one of them. Why must they do it? Let's just look at it. It is a very simple thing. The manufacturer is interested in it because of his output. If I had a factory I'd make every man a present of a tooth brush. It was done in the army. I helped to take care of fifty thousand men and had to talk to them. Pneumonia killed some of them because they didn't brush their teeth. What did they do with the tooth brush? Used it around the edge of the shoes to get the mud out. What is the first thing about the teeth? Well, we need them for enunciation. In the army it was absolutely necessary that orders should be distinct. The chewing of food means a lot in energy. Still, that means very little compared with some of the other things. Personal appearance is one. We all like beauty. You can not imagine a beautiful woman without any teeth. But let that go. In the mouth are 48 varieties of bacteria. If you chew the food without brushing the teeth you swallow those bacteria and the food ferments in the stomach and often it passes the quarantine of the stomach and goes down to the bowels.

There was an old doctor in 1822 who lived on the shores of Lake Champlain—Dr. Beaumont. He had a patient that was brought to him by the name of Alexis St. Martin, who had a hole shot in his stomach, and the doctor used to put food in this patient's stomach and watch it digest. He found that gastric juice would keep indefinitely under ordinary circumstances but that if he swallowed much saliva it spoiled quickly. Why? Because the saliva was full of bacteria. Do you know that in the army in the grippe epidemic very few if any died from grippe? They all died from pneumonia. Why? There are four types of pneumonia germs. Nearly all died of the fourth type. That is a mouth bacteria. They got the grippe and then the pneumonia bacteria that inhabited their mouth and grew there went into the lungs and killed them. If they had all brushed their teeth regularly, many of them would have lived. Many, very many of the six hundred thousand people that died in the United States would be alive today if they had brushed their teeth in that epidemic. But that is very little compared with the other thing. A tooth dies, but you do not always know it. At the root of that tooth there comes a very small abscess. From this bacteria and the toxin are absorbed in the system. Just the same as in the tonsils. The tonsils and the teeth make over 90 per cent. of our infectious disease. The poison may go into the heart, producing vegetation of the valve; or go into the kidneys, and make Bright's Disease; or go to the bladder and make inflammation of the gall bladder. Nearly all rheumatism comes from bad teeth.

Do your workmen know that anaemia, the loss of the red blood corpuscles which carry the oxygen to the tissues, is often due to abscesses at the roots of the teeth or old roots in the mouth? Have you got a dentist in every factory pulling out those old roots? No. The first thing I did at Hog Island where I was consulting surgeon was to put three dentists there. They said a great deal of money was spent there. Thank God, I had an opportunity to demonstrate some things that had never been done before.

Deaths from shock and hemorrhage! Men die in a few minutes from shock, but if you have blood to inject into them right away you often may save them. We hired three men, and gave them \$1,200 a year apiece and fattened them up and kept them raking leaves, and when a man got injured we took some blood from them and injected it into the injured person. We saved three men worth \$5,000 each according to the Pennsylvania Compensation Law the first month. \$15,000 against \$3,600 in the first month!

How about washing of hands? It is from dirty hands that bacteria get into the mouth. What does the surgeon do? Simply wash his hands? No, he puts on rubber gloves, even after he has put his hands into absolute alcohol with bichloride. I remember when I was a boy going to college George Francis Train sat in the park. It was back in 1874 and I remember asking old Train, "Why won't you shake hands with anybody?" and he said, "I don't know where a man's hand has been last." There is something in it. Take the case of Typhoid Mary. How did she give typhoid to 28 different families? Because she had typhoid germs on her hands. Very little, but it gave disease. Does every workman wash his hands before he eats lunch? There is something that workmen generally do not know. That man that was talking about the three-hour day, did he know that Scripture says, "By the sweat of thy face thou shall earn thy bread"? The man that doesn't do it doesn't live as long as the worker. To live long you have got to work. Work leads to longevity. The rich man of today, what does he do? Does he do like the man in the Bible who said, "Now, soul, we will enjoy ourselves and eat, drink and be merry"? The rich man today builds an eighteen-hole golf course and works like the devil to keep his health. Work doesn't hurt anybody.

That is what we have got to teach the workman.

We have in the neck a gland called the thyroid. We have more important ones over the top of the kidneys, little thin glands called the adrenals. These are like the governor on an engine. They control our circulation. If you lose those glands you die. These adrenals throw out a powerful drug. I know of two men on the front where a big shell burst and adrenalin was thrown out so that every hair stood on end for a week. A grouch, grief, anger or worry are ruinous to the body. They cause adrenalin to be thrown out. But joy, love, laughter prolongs life. What does that men? It means that we must teach the employee cheerfulness; that every man shall find in his daily work his greatest happiness. Just as God Almighty found happiness in the creation of the earth, we, made in His image, must find our happiness in our daily work, no matter what that work is.

I have simply given you an illustration of the care of the human machine. I have put before you the money side of the question. We have to do that with a corporation. In all the big plants of the steel industry throughout the United States many million dollars have been spent along these lines, in education of workmen, teaching them to wash their hands, to take showers, to do all these different things, and providing fa-



cilities for them and their families. Wonderful work! The steel industry today leads the world as a great industry. I am not saying that to the disparagement of others as far as welfare work is concerned, but it is the largest industry.

We now come to another side of it, and that is this: Cain's answer by the Garden of Eden was, "Am I my brother's keeper?" The Bolsheviks and the Socialists have used that for a great while, this cry of the brotherhood of man, which means nothing to that class. When I was in the Department of Health we had 187 laws. They all meant one law. How can you translate them into one law? The man that loves his neighbor won't spit on the sidewalk, he won't sell his neighbor bad food, he won't let smoke come out of his chimneys, he won't let his child with contagious disease run around and spread the disease. That is the thing that we must teach workmen, the love of their neighbors. It is a great thing to relieve suffering. It is a far greater thing to relieve penury and crime, so we can say with Abou Ben Adhem, "Write me as one who loves his fellow men." (Applause.)

**Mr. Ingalls.**—Mr. Chairman, before you come to the next speaker I want to express the hope that you have made arrangements with Dr. Darlington to write this speech for our **BULLETIN** so that all our members away from New York may profit by the illumination which he has given, and I hope that he will write it in just the way that he has talked and I hope that you have already persuaded him to do that. Leaving that to your hands, I move a vote of thanks to Dr. Darlington on behalf of the New York Section. **Motion carried.**

**Dr. Darlington.**—May I say one thing in reply. After the introduction of your Chairman and then this it reminds me of the Mayor of Cork. Mike and Pat were two brothers that lived in Cork and by hook or crook Mike was elected Mayor of Cork, and you know how they are inducted into office abroad. He had on the great wig and the robes of state and as he walked down the street Pat spied him and he ran up and called him, "Mike, Mike." There was no turning of the head to the right or the left. Finally he walked up and shook him and said, "Mike, don't you know me, I am your brother, Pat," and he said, "How can I know you when I don't even recognize myself?" (Laughter and applause.)

**The Chairman.**—I believe we have a stenographer taking down this speech, so I think we can save Dr. Darlington the tedium of writing it out.

Gentlemen, we are to be addressed this evening by the Assistant to the President of the Bethlehem Steel Company, who has been largely active in the great work which this company has done along with other means in producing efficiency of labor, that is by bringing the co-operative spirit between the employe and the executive and the owners of the organization. I introduce with pleasure to you Mr. J. M. Larkin, who will give you an idea, possibly refuting by his comment some of the contentions of our friend Mr. Samuel Gompers in regard to eight-hour days and 48 hour weeks, and various other advocacies which have come out in the press. Mr. Larkin. (Applause.)

**Mr. Larkin.**—Mr. Chairmen, Gentlemen: It is like being committed to a life sentence to speak after such an able man as Dr. Darlington. I feel that my visit here tonight has been well worth while, to meet with you and to have had the opportunity of listening to the Doctor. I will carry his message back to Bethlehem, as I have been much impressed with what he has said about industrial health problems. It does us all good to come in contact with men of his caliber.

The labor question is one that is receiving much attention and about which I have been asked to speak. Numerous reconstruction programs have been advocated and in almost every instance the subject of the future relations of capital and labor has received consideration.

What is the answer to this question that is receiving so much attention? In days gone by it was possible to deal with the individual employee with the best of results but as industry expanded the number of employees increased to a point where it was found exceedingly difficult to maintain this intimate contact.

As an example, in our plants going from pre-war conditions when we had approximately 40,000 employees to 130,000, one can readily see the difficult task we had of keeping in personal touch with so large a number of employees, even with a greatly expanded executive force. It is obvious therefore that we had to give much consideration to maintaining this very desirable contact.

We believe that the best co-operation and the greatest efficiency can only be brought about by establishing a close relationship with our employees. In view of this our management had in mind for a long while the inauguration of some direct method of dealing with all employees. The officers of the company held a number of conferences to develop a comprehensive and practical plan of representation. When the plan was com-

pleted everything that could possibly be incorporated in the plan was provided for. Our plan was inaugurated in the plants of the Bethlehem Steel Co. in October, 1918, and its adoption by the employees was followed by an introduction of similar plans in many other large concerns. I think it is quite generally agreed that the fundamentals of these several plans are similar. The details of operation, however, vary to suit local conditions.

One type of plan of which we have heard provides for a house of representatives and senate among the employees modeled after those of our national Government. The house consists of representatives elected by the employees, a senate consisting of foremen and superintendents and a cabinet made up of the officers. The other type of plan provides for the election by districts in the plant of representatives from among the employees. These representatives choose their own officers and appoint committees to take up with the management questions which directly affect them. This is similar to the plan of representation that is in operation in the plants of the Bethlehem Steel Co. The pertinent features of our plan are:

1. Representation by units on the basis of the number of employees in each plant.
2. Nominations and elections for representatives by secret ballot.
3. Specific qualifications for voters and representatives.
4. Provision for the organization of committees.
5. Provision for regular monthly meetings of committees.
6. Provision for joint committees of an equal number of employees' representatives and management's representatives.
7. Provision for joint committee meetings on alternate months.
8. Provision for a logical and expeditious procedure for adjustment of matters arising for settlement.
9. Provision for protection of the employees' representatives against discrimination.
10. Provision for amendments to the plan.
11. Does not abridge the employee's right to belong to labor unions.
12. Provision that company officials and persons having the right to hire and discharge are not eligible as representatives or qualified to vote.
13. Provisions for rotating representatives, every six months one half of the total number being elected to serve one



year. By this method there is always one-half of the representatives holding over, who are familiar with the work.

14. Provision for compensating representatives for time occupied in attending meetings.
15. Provision for management's representative who keeps the management in touch with the employees' representatives and represents the management in negotiations. Helps to remove difficulties, prevents misunderstandings and facilitates smooth operation of the plan in general.

During the six months this plan was in operation the most significant fact was that so many matters were settled without any friction whatsoever. This confirmed our judgment that in providing this channel for the discussion of matters an adjustment could be arrived at before becoming controversial in the slightest degree. Of 250 cases settled through the representatives, about 85 per cent. were settled in favor of the employees. We had 10 committee classifications. The first and probably the most important was employment and working conditions. Of the 250 cases 30 per cent. fell within that scope. Twenty per cent. of the cases came within the scope of wages, hours of work, bonus, piece work and tonnage schedules, 10 per cent. under health and works sanitation, 10 per cent. under safety and prevention of accidents, 10 per cent. on employees' transportation, 10 per cent. on practice methods and economy, and 8 per cent. were distributed among the following: Housing, domestic economies and living conditions, education and publications, pensions and relief, athletics and recreation, continuous employment and condition of industry.

In making their recommendations to the management the representatives showed good judgment and a full understanding of the issues involved. They were fair, open-minded, and above-board, and approached the many matters brought to their attention with the right attitude, considering both sides of the question, the employees' side and the management's side.

A typical illustration of the sincerity of the men was their discussion on the question of working hours. Following the signing of the armistice there was a cancellation of war orders which seriously affected the operation of our plants. The plant managers called the representatives together and explained to them the situation that the company was facing. Either of two things had to be done, the employees might go back on their old shifts of 11 and 13 hours or go to an eight-hour day of three shifts, but in any event all overtime had to be discontinued. The repre-

sentatives were asked to discuss the situation with their fellow employees and then report the result at another meeting. They did so and the answer came back that the eight-hour day was the choice of the men. They took the position that under the latter arrangement a larger number of men could be given employment. This is an indication of the spirit of fair play and co-operation which the employees have shown in many other matters of a similar nature.

The success of the plan may be attributed to the fact that the management has been absolutely sincere in the work and the representatives have approached the many matters that have come to their attention in a fair and open-minded manner. Their recommendations have been along constructive lines and they have shown a marked appreciation of the problems with which the management has had to deal. This is largely due to the caliber of the representatives elected. They were for the most part chosen from the older employees in point of service and were men of a very high grade, many of them having been in the employ of the company from 15 to 25 years. They have exercised an influence for good among the employees, creating an *esprit de corps* which is so desirable and necessary to the success of any enterprise.

The logical approach to the introduction of a plan of employees' representation or any other innovation is first to decide the necessity. Having decided that employees' representation is desirable, the following principles might be considered as fundamental, varying of course to suit local company and community conditions.

1. *Method of Inauguration:* Start with an invitation to employees to select representatives from their own number with whom details of a plan or agreement may be worked out.

2. *Unit of Representation:* The units of representation, or constituencies, should be departmental or in accordance with shop divisions. A sufficient number of representatives should be elected so that all employees may be adequately represented.

3. *Method of Election:* Election of representatives should be held in the plant at least annually. Representatives should be chosen by secret ballot, with such safeguards as to insure a free and untrammelled choice.

4. *Qualifications of Voters and Representatives:* Careful study should be made to determine, in view of local condition, whether there should be reasonable limitations of the privilege of voting and of eligibility for election as representatives.

5. *Personnel and Scope of Joint Conferences*: All matters of joint interest, such as hours, wages and working conditions, and the adjustment of grievances should be discussed and adjusted in joint conferences where the employees' representatives meet an equal or less number of representatives of the management. Frequent conferences are desirable for the consideration of constructive subjects of mutual interest.

6. *Provision for Appeal*: Provision should be made for prompt reference to the chief executive of the company of any matters that fail of adjustment in joint conferences.

7. *Guarantee against Discrimination*: There should be no discrimination against any employee on account of membership or non-membership in any labor organization.

8. *Executive Supervision*: A representative of the management should be responsible for carrying out the policy of the company in matters affecting industrial relations and in safeguarding the rights of the employees. This should be done without relieving plant executives of their responsibilities in these vital matters.

Gentlemen, in conclusion, I have enjoyed my visit with you very much. I have attempted to generalize only, but would be glad to answer any questions the members may desire to ask. (Applause.)

**Mr. Knox.**—What proportion of the employees are Americans?

**Mr. Larkin.**—Of 100,000 employees which we now have, between 60 and 70 per cent. In the shipbuilding plants, which constitute about 70,000 of the employees, there is a very big percentage of Americans on account of the Enemy Alien Law that was in force during the war. In our steel plants there has been a plan of Americanization going on and would say there is a maximum of 30 per cent. aliens.

**The Chairman.**—I'd like to ask Mr. Larkin to what extent the management takes the employees into their confidence regarding business conditions.

**Mr. Larkin.**—Every month in addition to the special joint committee meetings we have a meeting of the whole group of employees' representatives. There is a great deal of consideration given to the preparation of the program. The general manager of the plant is usually present at these meetings to talk freely and frankly of plant and general business conditions. The representatives are very much interested in the business outlook and very often make some real good suggestions. Our



management feels that these joint meetings are really worth while and I am told that the employees' representatives speak very highly of them.

**Dr. Darlington.**—To me this is the most interesting talk I have heard for a long time. Mr. Larkin speaks about his talk being disjointed and disconnected. It is one of the most eloquent talks I have listened to for a long time. It makes one very optimistic. That isn't giving away property, that is good business. If you explain to your men what you are doing and tell them what their profits are that means one hundred thousand votes are going to some one who is going to run the business right in Washington and God knows we need it. When you get combined like that, when you get those hundred thousand votes, they are going to put the right man in and that man is going to do what they want him to do and we will have a much more efficient Congress than we ever had before and the right kind of laws and not too darned many. That is a great trouble. I remember when I was health commissioner, the first year I was in they put 1,700 laws through the Assembly. How then can anybody keep tab on and enforce the laws? We get too many of these and all for no special reason except that some man who has been in Congress or the Legislature for a while feels he has got to do something to show his constituents he is there, but if it is going to come back to these people they are going to vote right and they are going to get far better representatives in our legislatures and that means a lot. That means the right kind of laws. Then you can really do something.

Yes, I feel very optimistic, almost as much as the Irishman we had in the hospital one day. He said, "Doctor, what's the matter with me?" I said, "You have got gangrene." "Well," he said, "Thank God, the color's right." (Laughter.)

**The Chairman.**—Gentlemen: For a discussion of the problem which Mr. Larkin has introduced for us, I would like to call on Mr. P. G. Beckett, Assistant to the President of the Phelps Dodge Corporation, as his company is also accomplishing great work on the same line in the education of its employees and the operation of a mining school for the education of its underground men and also has a splendid co-operative plan.

**Mr. Beckett.**—Mr. Chairman and Gentlemen: I won't keep you very long because it is getting late now but touching on some of those points that Mr. Larkin has spoken on and inasmuch as the properties of the Phelps Dodge Corporation are all out in the western states and perhaps not as widely known

here as the ones in the east, I would like to mention some of the things we have been doing for the last few years.

I believe, so far as the western states are concerned, that the Copper Queen and the Phelps Dodge Corporation were pioneers in most of this work that I think we are all doing now to try to get closer to our men. Perhaps the easiest way would be to go through very roughly and very generally some of the things that we have put into effect at Bisbee and others that we are trying out there and just touch briefly on them.

One of the things that we have is a liberal pension scheme. Now, this pension scheme was started several years ago. I think that, strictly speaking, any pension scheme is the better for having the money contributed by both the workmen and the company. In our case we started ours by the company contributing all of the money. I believe, in handling workmen, the less you do that smacks of charity, the better off you and they are, and I think anything of this nature where both the workmen and the company combine in their contributions to a common fund is much better.

We have also a sick benefit association to which both the workmen and the company contribute. In this case the company contributes about 25 per cent. and the workmen 75 per cent. This association received a rather severe jolt in the grippe epidemic that swept this country last fall, owing to the abnormal amount of sickness and death, and I know we have found since then that the amount that was provided by both sides was insufficient and the yearly contributions will probably have to be raised.

We have also, in the last 18 months, inaugurated a yearly service bonus at Bisbee, whereby continuous service for one year is rewarded by a bonus of \$100, which amount is increased with each additional year of service up to a certain maximum. This should have the effect of encouraging steady work and stabilizing labor. We feel that it is, in no sense of the word, additional wages nor is it charity, because the constant moving and turnover of labor is a very costly thing and if a yearly service bonus will tend to keep men on the plant and eliminate, to a great extent, the training of new men, the company is thereby saving money.

We also have hospital committees that are elected by the workmen themselves to represent the men in all hospital matters. At one time we had criticism leveled at the companies because they took a certain amount off the men's pay each month for hospital and medical services—so much for married men

and so much for single men—and because it was said the men were given no chance to become acquainted with how the money was spent. We hope that through these hospital committees the men will not only learn what the hospital and medical expenditures consist of, but, in general, will get a thorough understanding of the hospital and medical services which the medical staffs render, and give us the benefit of constructive suggestions. In the last few years all of our branches have experienced heavy deficits based on employees' contributions.

Also, we have workmen's committees somewhat on the lines indicated by Mr. Larkin. These committees are plant committees and comparatively small ones. From a plant of 2,000 men there would perhaps be only about five or six workmen on the committee. Those half dozen workmen would be elected from different departments and, as in the case that Mr. Larkin mentioned, a machinist might be the man that was chosen representing the electrical, carpenter, blacksmith and boiler departments, and though these committees are small, so far they have worked very well. The men are elected by secret ballot and their membership tenure is usually one year. Only daily wage earners are eligible for election. We like to see men elected who have good live ideas, who understand the problems, and have constructive criticism and suggestions to offer. It is necessary to have men that have the welfare of the workmen as a whole at heart and who bring up, of their own accord, good schemes, because we feel that any of these things we can get that originate from the workmen, are usually more effective than those things that originate from the company. I think it is easy to fall into the error of starting things that we think the men would like and would be very excellent things, whereas, as a matter of fact, if it had been left to their counsel and their judgment, it would not have been what they would have advocated.

We try to get all complaints handled direct by the workmen to their foreman first. We discourage anything being taken to grievance committees—they are known as grievance committees out there—without first trying to settle the matter with the man's boss, and if he cannot settle it, it is supposed to go to the head of his department. If the matter can't be settled there, it is then taken to the grievance committee.

Now, in some of the camps where we are operating the companies go one step further—or rather they are doing this during the period of the war. Some of the workmen felt that it was not fair to have all matters settled by the companies. That if the workmen's committee brought up a matter in which they felt the workman was in the right and the company turned



it down, it was not quite the finish of the thing or, at least, that it should not be the finish. They felt that it was too much like having the defendant designate the judge and jury who were to pass on the plaintiff's particular complaint, and they felt that no matter how square the plant manager might be, there was always the question of personal judgment, etc., and that it should go to a third party. So, when the President's Mediation Commission came to Arizona in the summer of 1917 to settle certain labor disturbances and agitations that were going on out there at that time, it was decided that a Federal mediator should be the third party, so that, if after a matter had been handled through regular routine up through the foreman and the head of the department and up to the manager of the company, and the decision of the manager was not satisfactory to the workmen's committee, that it had a right to take the matter to the Federal mediator. Now, as a matter of fact, I understand that privilege has been very seldom used and it is really surprising how few cases of grievance have ever come up to the Federal mediator. Nearly everything has been settled between the grievance committee and the management or before it reached the management. As I said before, this Federal arbitration system is a purely war measure.

We have also installed in all of our plants a central employment agency which hires men. The foremen and bosses no longer hire men themselves. They simply turn in their daily needs in workmen to the central agency which does all of the hiring. This is a thing that is fairly common now and, without doubt, it is the right method. And similarly in the discharging of men, we have felt that no foreman had the right to discharge a man from the company's employ. He had the privilege of letting him out from his own employ but not from the company's and therefore, all that he can do, is to simply turn this man back to the central employment agency advising it that he is not satisfactory to him personally. Usually, unless it is a case of deliberate violation of the company's rules, the central agency gives that man a second tryout in some other division of the mine or plant, and it is generally only on his proving unsatisfactory the second time and giving unmistakable evidence that he will not fit in anywhere in the organization, that he is finally discharged from the company's employ. We feel that this is a very excellent thing because there isn't anything that a workman feels more or fears more than being thrown out of work unjustly. It means giving up his house, often at a loss, and if he is a married man, moving his family and perhaps not getting work very easily somewhere else. Often we know

it to be the case that a man has been discharged through personal prejudice on the part of his foreman or boss, and therefore this practice of discharging men through the central agency, and insisting on getting full reasons from the foreman why he is not satisfactory, tends to do away with complaints along these lines. Nor is this plan detrimental to the discipline of the plant.

We have the usual safety and sanitary departments, which are composed of committees chosen by the men themselves and on which committees we try to get as many workmen as we can. We find that they take very keen interest in going around the plant, looking over things, and that we get far more ideas from them than we ever could from any one safety inspector. We also go in at our plants for first aid training, which as a matter of fact, is a rather hard proposition because it is always done out of working hours and the men do not always take very readily to it, but still we have a large number trained and it is surprising in what good shape most of the injuries to men in the mine are put before they reach the surgeon's hands. We also have quite a lot of mine rescue work. In some of these mines there is a great deal of timber in the old square set stopes and with the pyrite filling that was sometimes used in those days, a fire is quite apt to get started. In addition to this chance of fire there is always the risk of fire starting in drifts or in the shafts. These men go through drills, wear helmets, and do emergency work in smoke chambers that fits them for coping successfully with a real fire.

We have the usual Y. M. C. A. and free libraries, etc. Also, in some cases, we have a loan association to provide money for workmen who want to build their own homes. We believe that this is quite a helpful thing. If a man is given sufficient help, he usually wants to own his own home. We feel it is infinitely better both for the man and for the company to have it this way than for the company to build the houses and simply rent them out. The workman feels that there is less paternalism to it. We go quite strongly on having foremen's and bosses' dinners and talks every so often, at which various matters are discussed and we are particularly trying to impress all of our foremen with the idea that they are the point of contact between the company and the men. In any large organization it isn't possible for the management, even if it had the time, really to get in close touch with the men. Now, when the ordinary workman enters the employ of a company his viewpoint of the company is often made up by the way he is treated by his foremen or his bosses and sometimes that treatment does

not seem very good to him. He feels he is looked upon too much as a mere number in the payroll or as a mere cog in the machine; he often isn't told the company's policies, etc., and thinks he is looked upon too much just a mere unit to go down into the mine and get the dirt up, and therefore, we are laying considerable stress on getting the foremen and the bosses to look on this matter in a common sense and humanitarian way and to get closer to their men because we feel that by the foremen getting closer that the company will too.

Lastly, one of the things that we have started recently is a course of education and training for men that want to become shift bosses and foremen in and around the mines. These meetings or classes are held every so often and different men in the organization prepare and present papers for discussion. I think that at Bisbee we now have over one hundred men—miners as well as surface men—who attend these schools. The courses are well worked out and planned with the idea of educating progressively and in this way we are trying to build up an organization so as to get the right type of foreman and boss with the proper knowledge of how to handle labor as well as operating details. From all we can tell it is going to work out very satisfactorily. The men themselves take to it and they are very glad of the chance to be taught things and to be given training so that when there is an opening in the plant organization they will be capable of taking it and holding it. Thank you. (Applause.)

**Dr. Darlington.**—I don't want to take up too much time and talk after every speaker, but I'd just like to have a word. The last speaker spoke about this work of recent years. In 1887 I was surgeon of the Copper Queen company out at Bisbee, at the request of Mr. James Douglas, whose kindly heart and broad vision meant a great deal in those years, and it did an enormous amount of welfare work. The first thing it did in this mining town was to build a museum. At that time it consisted of twelve hundred inhabitants, a hundred and fifty dogs, thirteen saloons and my office. One of the first things they did was to ask me to find out what the men wanted and I inquired among them and they said they would like to have a brass band. They couldn't play but they sent out a full brass band and each one picked out the instrument he admired the most and, my God, what a winter we spent! (Laughter.) Anyway, by springtime they had learned to play "Old Black Joe." Then one of my patients died. Well, they died all winter long. (Laughter.) The one that died that spring was very popular. I had started a graveyard in the canyon before that. (Laughter.)



That band played "Old Black Joe" eight times between the town and the graveyard. Why, after I had been there a little while (we had no undertaker in the town) the company invited an undertaker to come out there. It was a good thing because just before that time one of the men died and we had to go to the carpenter and ask him if he could make a coffin. "Sure," he said, "I can make a coffin and the brass plate too. What shall we put on it?" We said, "Dennis McGrath, 28" and he said "I can't make an eight, but four sevens is 28, so I will put on four sevens." He said, "Here is Dennis McGrath dead. He was so full of life how did he ever escape the flood?" (Laughter.)

Seriously, gentlemen, I don't know of any company I'd like to pay tribute to more than to the Copper Queen company, for I don't know of any company which even in the early days took as much interest in its men as the Copper Queen company did, and even in the old days it had many of the things that have been mentioned here and everything went as smoothly as a rough mining town could go and a success was made when other mining camps were a failure. The company built a very beautiful hospital and said to me "Get us the best nurse that you can get to come out." I went to Bellevue and got the one next to the head, Jane Delano, who died last week in France, a nurse and the head of the Red Cross for years, and who sent over eighteen thousand nurses abroad. The best of everything the Copper Queen always wanted and I am glad of this opportunity to say a word that even 31 years ago it did everything that it could do for its men. (Applause.)

**The Chairman.**—Gentlemen, what further discussion have we and what questions? I might ask Mr. Beckett if he can tell us for how long a period of time the employees' representation scheme has been in operation with the employees' committees considering hours of work and wages and such factors?

**Mr. Beckett.**—I think that went into effect about August of 1917.

**The Chairman.**—I think it was one of the first plants in the country to adopt that scheme.

**Mr. Beckett.**—I feel that the slogan we should all adopt at the present time is "anticipate." In short, keep one lap ahead at least of what is in the other fellows' minds and I think in that way things will not come to the pitch here that they have on the other side. But another point is this. It was brought out at the recent coal investigation hearings that they have been

having in England, so I hear on good authority, that the knowledge that the colliery owners had of the real problems that they had to face was very insignificant, to say the least; in short, that their presentation of their side, either through lack of knowledge of the conditions, or lack of being able to present the situation clearly and with a thorough knowledge of the problem that they were facing, was greatly to their disadvantage. If my information is correct, we should profit by it.

I think we should realize that a whole lot has happened in the last five years—much more than usually happens in the normal span of five years—and we should profit accordingly by that realization. We should have somebody in our plants, in our organization, who has the time and is free enough from operating details to thoroughly take care of all these problems so that by our having a deep seated and not merely superficial knowledge of the difficulties of any particular situation that are confronting us we may anticipate them and have the knowledge how to meet them.

**Mr. Knox.**—I take it that it is the wish of Mr. Larkin that we shouldn't without examination adopt any system, particularly not without an examination of the Australian system, which, as I understand it, requires by law the unionization of each shop; each shop, mine or works is obliged to unionize and deal directly with the employees. Furthermore I hope the New York Section may see its way clear to consider the Australian case in order that in turn it may be presented to the Society.

**Mr. Ingalls.**—I think that we have heard this evening some wonderfully illuminating addresses on the most important of all subjects that confronts not only this country but the world today, and I am going to see that the Secretary's office expedites the publication of the next BULLETIN, with the co-operation of the speakers of the evening, so that all the members of the Society throughout the country may profit at the earliest possible moment by what we have had the good fortune to hear this evening.

There have been many points put before us tonight which we could discuss not only the remainder of this night but also many nights. There are many that I should like to discuss at length, but the hour is late and I am going to confine myself to just one point and that is one that Mr. Larkin spoke about, namely the difference in conditions between this country and Great Britain. You all know my opinions of the problem, broadly speaking, from the standpoint of the engineer and economist, which I expressed in my address last January as

the retiring President. I feel that while poisonous fallacies are being emitted from ten thousand soap boxes, people like ourselves and others are not saying anything, and we are derelict in our duty in not saying anything. I have been pursuing investigations on the subject that I talked about last January. I presented a paper before the Canadian Mining Institute in March on the subject of Industrial Co-operation and I am going to follow as soon as possible with a more specific paper on the division of the income of the American people.

The researches into that subject show some very startling things and perhaps the most startling of all is that according to the income tax returns for 1916, which is the last year from which the necessary figures are available, the people of this country who paid income taxes, which means people in receipt of incomes of \$3,000 a year and upward, received only about 55 per cent. of the dividends paid by American corporations. It follows necessarily from that that nearly one-half of the dividends paid by American corporations were received by people with incomes of less than \$3,000 and largely by the wage earners themselves. Now, that is one great difference between the conditions of this country and the conditions of Great Britain. It is a reason why America is not going to be Bolshevik. The people in this country who are listening to the intellectual Socialists and the parlor Socialists and the I. W. W.s are absolutely backing the wrong horse and they are going to find it out.

Now, nobody has yet adequately studied the difference between the industrial conditions of this country and those of Great Britain; I do not believe that anybody has even made a beginning of such an investigation. But the fact that the British coal miner produces only one-third the number of tons of coal per annum that the American coal miner produces shows that there is some radical difference between the conditions here and the conditions abroad and we must not take too seriously the recommendations of the Whitley report, but we must proceed on our own lines without prejudice or influence from anything that they have done on the other side.

There is only one thing more that I am going to say and that is, as you all know, I object to the term of industrial democracy. I do not think it signifies what we mean. What we have been talking about this evening is, if I may coin an expression on the spur of the moment, a great deal more like industrial friendship than industrial democracy. (Applause.)

**A Member.**—I am very sorry that this discussion hasn't touched the question of the division of profits. It seems to me that



Mr. Ingalls' expression might better be industrial co-operation. Labor is just as essential in industry as capital. Each contributes a certain portion. In any industry there is a certain amount of capital required. Given proper investment of capital and given reasonable efficiency in labor, those two questions being equal to the same thing are equal to each other. I know little about this subject, as a matter of fact, but it has seemed to me lately in thinking it over that it is a rational basis on which to discuss the proportion of the profit of industrial operation which should go at once to capital and to labor. I don't know whether the Bethlehem Steel Company does anything of the kind or not. A lot of companies, of course, get their employees to buy stock. The Eastman Kodak Co. sold its employees a big block of stock at par which was worth in the market \$600 a share. Such things as that appear to be pure charity. On the other hand, the recognition of such a principle as I spoke of seems to afford a rational basis for the division of the profits of the industries.

**Mr. Larkin.**—I will answer that by saying that we are continually studying the question of pensions and allied subjects but as yet have adopted no specific plan.

**Dr. Darlington.**—There is just one thing that is needed and that is best illustrated by a little story. Down on the beach there was a hotel and a girl and a young man walked down on the beach and sat down and they had a parasol and they put it behind them and as they sat down he leaned a little toward her but nothing happened and finally she screwed up her courage and said, "As you leaned over I thought you were going to kiss me." He said, "I was, but I had sand in my mouth." She said, "You had better swallow it quick for you need it in your system."

I have here a pamphlet that I wrote. You know we do weep over the laboring man. Sometimes the man who is running the business needs a little attention also. (Laughter.) I used to take care of a great many thousand people but I never found anybody that seemed to care a continental how many hours I worked. Here is a little pamphlet on "Prolonging the Lives of Busy Men." If I had the names of those present tonight I would very cheerfully send them copies which might do some good. There are ten health commandments. The first one is, "Keep your mouth closed when breathing, also when angry." (Laughter.) And there are a few other things of that kind.

**Mr. Ingalls.**—If Dr. Darlington will send them to the Secretary's office I will see that those pamphlets are sent to our members.

**Dr. Darlington.**—I always carry them with me, out of fear that I might break down in my speech, and so that I shall have something to fall back on.

**Mr. Ingalls.**—That is a good idea, but it is 11 o'clock and as it is impossible to finish this subject tonight I move that the New York Section continues the same subject at its next meeting and invites Dr. Darlington and Mr. Larkin to be present. I hope that they will be able to be with us. **Motion carried.**

**The Chairman.**—I raised the question with your President whether the M. and M. Society wished to take an active stand on the labor situation and to be in a position to make such recommendations to the legislative bodies in Washington and elsewhere, thus giving the opinion of the Society as it has done in the past on other subjects. Mr. Knox said by all means, that was distinctly in his mind, the desire of the Society to do so. One word in elaboration of a question which Mr. Ingalls raised in regard to income possibilities of the country. It was my pleasure to interview the well-known economist, Mr. Harvey Fiske, in regard to the pro-rata sharing of the Victory Loan by the families of this country. It may interest you to know that fifty-two billion dollars is the estimated income of the 2,235,000 family groups in this country, that there are  $4\frac{1}{2}$  persons in the average family group and that about 77 per cent. of this is earned by families whose income is between one and two thousand dollars a year. Also that if we required all of the income of those family groups earning \$1,500 a year and more we would just meet this new Victory Loan of four and a half billion dollars. This indicates that the money in the country available for the Victory Loan must be provided by what we have considered the low wage earning class.

If there is no motion or further discussion the Chair will consider a motion to adjourn.

The meeting thereupon adjourned at 11:10 p. m.

F. F. SHARPLESS,  
*Section Secretary.*

## COUNCIL.

**Meeting of May 1, 1919.**

A meeting of the Council of the M. M. S. A. was held at the call of the President on Thursday, May 1, at the Columbia University Club, New York.

The meeting was called to order at 5:20 p. m., Mr. Knox presiding. These other Councillors were present: Messrs. Dorr, Ingalls, Kirby, Sharpless and Yeatman. The Assistant Secretary attended.

The minutes of the meeting of February 3 were approved as previously submitted to the individual Councillors.

**Deceased Members.**—The deaths of J. E. Johnson, Jr., and Edward L. Dufourcq having been announced to the meeting, the President stated that the Council and the Society should take some action relative to Dufourcq's death and the loss of other American engineers in Mexico. Three different resolutions covering the subject, prepared by Messrs. Corning, Sharpless and Ingalls were then read, and after considerable discussion the matter was "referred to the Executive Committee with power."

**Reconstruction Program.**—The President explained that the business before the meeting in reference to the reconstruction program had been carried over from a meeting of the Executive Committee and that it comprised the consideration as to the advisability of appointing committees on Labor, Education and Publication.

At the outset there was some question among those present as to the usefulness of such committees, and particularly as regards to that on Labor, but finally on motion properly passed, the President was empowered to establish these committees.

The acting secretary announced that Professor Milnor Roberts and Mr. E. Gybbon Spilsbury had accepted appointment to the Committee on Chrome.

The meeting adjourned at 6:45 p. m.

EDWARD B. STURGIS,  
*Acting Secretary.*

## OBITUARY.

### EDWARD LEONCE DUFOURCQ.

As announced by the public press of April 19 and later confirmed by telegrams to his family and associates, Edward L. Dufourcq was attacked and wounded by bandits on April 16 near Teziutlan, State of Puebla, Mexico. At the time of the attack he was traveling on a railway motor car between the town of Teziutlan and the mines of the Teziutlan Copper Company, of which he was assistant general manager. From meager





EDWARD LEONCE DUFOURCQ



accounts so far available, Mr. Dufourcq, seriously wounded, was taken from the scene of the attack by the bandits, his body not being recovered until late the following day.

Edward L. Dufourcq, consulting mining engineer, was born in New York City, August 6, 1870, son of the late Leonce F. and Hortense Leer Dufourcq. Receiving his preliminary education at Dr. Chapin's school, he entered the college course, Columbia University, in 1886, but two years later entered the School of Mines from which he graduated with the degree of engineer of mines in 1892.

For two years after graduation, Dufourcq, as an assistant engineer, filled numerous positions in mining, railroad, and municipal work, in Central America and Mexico, and in the United States. Also, during this period, he was for a short time an assistant in the mining course at Columbia University.

Between the years 1894 and 1896, Dufourcq was superintendent of the International Mining Co., San Miguel del Mezquital, Mexico, and then accepted a similar position with the Consolidated Kansas City Smelting and Refining Co., in charge of its mines in Sierra Mojada, Mexico, where he remained for two years.

In 1898, and until 1901, Dufourcq was a member of the firm of Olcott, Fearn and Peele, consulting engineers with headquarters in New York City. Then, in this latter year, he became manager of the Andes Mining Co., at Chimbote, Peru, followed by three years (1901-1904) as general superintendent of the Montezuma Lead Co., Santa Bárbara, Chihuahua, Mexico.

Dufourcq finally in 1904 opened offices in New York City and began the practice of a consulting mining engineer on his own account. From this time forward was probably the most important period of Dufourcq's life, culminating in the very successful management of the mines of the Teziutlan Copper Co. of which he had been assistant general manager for two years at the time of his death. During these later years, he had been also consulting engineer to the United Colorado Mines, the Sovereign Mines of California, and manager of Minas Pedrazzini at Arizpe, Sonora, in which he himself held a large interest.

This encounter with Mexican bandits which was the cause of his death was not Dufourcq's first experience, for, something less than a year ago, he was captured during a raid of the Teziutlan mine and held for ransom. All of this is the more surprising because Dufourcq's many years of residence in Latin-American countries had put him on familiar grounds with their peoples and, according to his intimates, he was beloved by all classes of Mexicans in particular.

At the time of his death, Dufourcq in addition to his association with the Teziutlan Copper Co. was also president of Dufourcq & Co. with offices at 18 Broadway, New York.

On June 29, 1896, Edward L. Dufourcq was married to Ernestine King, who died in 1911. In 1917, he married Effie Mason, who, with one child from the former marriage, survives him.

Dufourcq was a member of the Mining and Metallurgical Society of America and the American Institute of Mining and Metallurgical Engineers. He was a member of the DKE Fraternity and of the Columbia University Club.



## AN APPRECIATION.

JOSEPH ESREY JOHNSON, JR.

The biographical sketch of the professional career of J. E. Johnson, Jr., published in the April *BULLETIN* said nothing about the man himself. To remedy this defect permission has been requested and granted to publish the following appreciation by Bradley Stoughton which first appeared in the May *Bulletin* of the A. I. M. E.

Joseph Esrey Johnson, Jr., had already achieved rare distinction as an able metallurgist, clear thinker, brilliant author, and wise consulting engineer to bankers and operators; he had achieved the essentials of a great career when death cut short his activities on April 4, 1919, in the forty-ninth year of his age. He belonged to a family of iron blast-furnace men and mine managers. His father, Major J. E. Johnson, after serving with distinction in the Army of the North, identified himself with the iron mines and blast furnace at Longdale, Va., with which he was connected during almost his entire business life. It is significant that, during those troublous times of reconstruction in the South, he enjoyed always the affection and respect of his neighbors and associates alike. From him his son obtained not only a thorough training in blast-furnace practice and iron mining, but great personal courage and force of character. His mother, who survives both her husband and sons, possesses rare intellectuality, humor and a tenderness and human sympathy which those who were privileged to know well J. E. Johnson, Jr., recognized beneath his exterior of aggressiveness and will power.

In a recently published analysis of the qualities which characterize the world's great men, three traits stand out pre-eminently; viz., independence, courage, and intellectuality. Each of these characteristics J. E. Johnson, Jr., possessed in extraordinary degree. His early education was obtained under a private tutor at Longdale, and this circumstance probably enhanced a natural tendency to independence of character and individuality which, however, under the control of his unusual power of straight thinking and clear analysis never allowed him to go far astray. It has been said of him that if once he set his mind to a problem, however knotty, he scored a bull's-eye before the subject was dropped. His manner of attacking a subject involved first mastering the details of the available knowledge; then, putting this acquired information to one side, with an untrammelled mind blazing out a path of his own, so clear, so well-defined, and expressed in such simple terms that he illuminated the whole subject without distorting the original data or discussion. His two books, "Blast-furnace Construction in America" and "The Principles, Operation, and Products of the Blast Furnace," on the iron blast furnace together form the most comprehensive, the most enlightening, and the most useful treatise on the subject ever produced in any language. But his ability did not end with the mastery and elucidation of principles enunciated by his predecessors; his own discoveries and inventions in the metallurgy of iron have established his reputation in every civilized country where iron and steel are made. The three most important of these doubtless are his thermal theory of the iron blast furnace, which ranks with Sir Lowthian Bell's chemical practice of the iron blast furnace as the two greatest scientific advances in our knowledge of the art; his original classification of iron and steel as an unbroken series of alloys of iron and carbon; and his discovery that oxide, instead of being the unmixed

evil which it was accredited in the minds of most metallurgists, actually benefitted the strength of cast iron.

There are many stories told of Esrey Johnson's personal courage, but probably the most spectacular one is the prevention of attempted lynching in Virginia in 1909. A young white girl had been murdered by a colored boy under those horrifying circumstances with accounts of which we are all too familiar. Johnson was not only manager of the mines and blast furnace of the locality, but was one of the officials of the county. He organized the search whereby the negro was captured, brought to Johnson's office and a confession of the crime wrung from him. The usual crowd collected quickly, thirsting for vengeance in the form of hanging or burning. Practically alone, Johnson held this crowd at bay for several hours, sometimes mixing with the crowd and pledging his honor that the colored boy should be tried and executed according to law, sometimes pleading for the good name of the community, and when necessary, "showing his teeth" to those who can understand no other argument for the curbing of their personal inclinations or intentions. He has told me that he expressed himself in substantially these words: "I am going to see this nigger hung in accordance with law and order. If you fellows try to prevent me, you may get me, but I will get some of you first." I am sure that at this point in the argument he smiled, for he had a very expressive smile which endeared his friends to him, and which he could make very convincing when he desired. Finally, the morning train arrived on the track just outside Johnson's office. He realized that this was the moment when a coup would be attempted, but he had already laid his plans with the sheriff over the long-distance telephone. The train stopped exactly where he had directed. He rushed the trembling culprit by the crowd of angry, heavily armed men into an empty railroad car occupied only by the sheriff. The door was barricaded behind the three men and train pulled out before a rush could be accomplished. Another crowd had to be over-awed at the entrance of the county courthouse, where the judge had called a special term of the court. To him Johnson delivered his prisoner and made good on his promise that justice should be done, which it ultimately was. The whole story of this interesting episode is told in the issue of the *American Law Review* for November-December, 1911, under the title "Lynching Unnecessary."

Johnson led a white life. There was no weak spot in his professional or personal armor of honor and sincerity. His home life was an unusually happy and congenial one. He married Miss Margaret C. Hilles of Wilmington, Del., and she was not only his friend and comrade, but an intellectual stimulus and helpmate in a very busy life. She, with one boy, J. E. Johnson, 4th, survives him.

I cannot give a better summary of Johnson's professional attainments than by quoting from a letter from his friend, James Gayley. These two master minds found mutual sympathy and understanding. Johnson had an unbounded admiration for Gayley, whom he describes in the dedication of his books as the "founder of modern American blast-furnace practice." Gayley made of Johnson a pupil and gave him valuable advice and assistance during the early days of his establishment as a consulting engineer in New York City. On the day of Johnson's death, Gayley wrote me as follows:

"American metallurgy of iron has lost its shining light and the world is poorer thereby. . . . Esrey Johnson is and was the greatest man in the metallurgy of iron and the clearest thinker of any man today. He seems like a younger brother gone and none come to fill his place."

Johnson always identified himself with the public work of his profession

and community. He was for many years a member of the principal engineering societies, and especially of the American Society of Mechanical Engineers, The Mining and Metallurgical Society of America and the American Institute of Mining and Metallurgical Engineers. His pen has enriched the literature of these and other societies on both sides of the Atlantic. His interests naturally brought him more closely into affiliation with the A. I. M. E. for whom he served as a member of the Board of Directors and chairman and member of many prominent committees, including the vice-chairmanship of the Iron and Steel Committee. Of recent years he has been active in guiding the policies of this Institute, and at the time of his death was, besides a director, a member of the Executive Committee and chairman of the Committee on Admissions.

## CHANGES OF ADDRESS.

Aldridge, W. H.....50 East 42nd St., New York  
 Allen, John H.....17 Madison Avenue, New York  
 Chase, M. F.....6 Church St., New York  
 Cornell, R. T.....Room 1424, 61 Broadway, New York  
 Graton, L. C.....War Industries Bldg., Washington, D. C.  
 Holden, Edwin C.....1100 Garrett Bldg., Baltimore, Md.  
 Keene, A. F.....233 Broadway, New York  
 Requa, M. L.....Hotel Commodore, New York  
 Stow, Audley Hart.....Box 1477, Charleston, W. Va.  
 Weekes, Frederic R.....Room 3612, 233 Broadway, New York

## PERSONALS.

Ralph Arnold was in New York in the middle of April. He is leaving on May 1 for a few weeks' stay on the Pacific Coast, returning later to complete his work in Washington. Mr. Arnold will retire from Government service on July 1.

Howland Bancroft, according to the *Engineering and Mining Journal*, will on June 1 become associated with B. L. Thane, with offices in San Francisco.

Albert Burch is now the senior member of Burch, Hershey & White, consulting engineers, San Francisco. Mr. White takes the place of Mr. Caetani, whose resignation from this firm was announced in the April BULLETIN.

J. A. Burgess announces that his title has been changed from general superintendent to that of general manager of the United Eastern Mining Co.



Percy E. Barbour, who resigned from the army with the rank of captain, has been commissioned a major in the Engineer Section of the Reserve Corps.

H. Foster Bain has resigned from the office of assistant director of the U. S. Bureau of Mines which he had accepted for the war period. It is reported that he will leave for China next month.

E. S. Berry, Captain of Engineers, was discharged from service in March. He left late in May for San Francisco on a holiday trip.

J. L. Bruce was in Washington on business late in April.

J. Parke Channing is a member of the Advisory Committee for the Industrial Service Movement of the Young Men's Christian Association.

M. F. Chase, returned to the United States early in April. He was associated with Mr. Baruch in his work in connection with the Peace Conference. Mr. Chase will be associated with the Leonard Construction Company with address at 6 Church Street, New York.

A. S. Dwight, Major of the Eleventh Engineer Regiment, has returned from overseas. It will be remembered that he was a part of the very first contingent of the A. E. F. to arrive in France. He has received the British Distinguished Service Order.

A. B. Emery was in Butte, Montana, during this month making a study of copper smelteries. Mr. Emery is general manager of the Messina Transvaal Development Co., Ltd., with headquarters in South Africa.

J. R. Finlay is the author of "Nature and Uses of Capital in Mining" published in the May 3 issue of the *Engineering and Mining Journal*.

Louis D. Huntoon, who left on March 26 for a professional trip to Utah and Arizona, returned in the middle of this month.

Edwin C. Holden, whose headquarters are now located in Baltimore, is reported to have completed the development and equipment of the Cuban mining properties of his company.

A. F. Keene has accepted appointment as consulting engineer and member of the American Advisory Committee to the Gold Fields American Development Co., Ltd., with headquarters at 233 Broadway. Mr. Keene, by the way, writes to explain that,

although he had been consulting engineer to the Burma Mines, Ltd., as announced in a "Personal" in the February BULLETIN, he resigned from this position early in 1918.

J. F. Kemp departed for the west early in April.

George A. Laird, whose address is now Oklahoma City, Okla., was engaged about May 1 in examining coal properties in Arkansas and Oklahoma. Mr. Laird is associated with W. G. Williams in general consulting work.

Robert Linton has been absent from New York on an inspection tour of his company's mining properties. He returned about two weeks ago.

Halstead Lindsley, who was major of Ordnance, writes the Secretary that his resignation from the service took effect on January 2.

James MacNaughton, vice-president and general manager of the Calumet & Hecla Mining Co., has become a director of both the Mineral Range Ry. and the Duluth, South Shore & Atlantic.

J. F. McClelland, who had been Chief, Production Engineering, Engineering Division, Bureau of Aircraft Production, resigned from service on February 18. Professor McClelland writes that his connection with the Government began with October, 1917, his first position being that of editor-in-chief of the Specification Section, Equipment Division of the Signal Corps.

H. G. Moulton, who for many months held the position of engineer to the War Industries Board, is now Chief Examiner of the War Finance Corporation.

Joseph Hyde Pratt's name appears as the editor of "North Carolina Biennial Report of the State Geologist, 1917-1918."

William A. Pomeroy visited New York about April 15 and remained for two weeks.

Frank H. Probert in his capacity as consulting engineer to the U. S. Bureau of Mines made, in the latter part of April, a preliminary report on the damage done by the Germans to the coal and steel industries in northern France. Professor Probert is a member of that special investigating committee of which F. G. Cottrell is also a member, and George S. Rice the chairman.

M. L. Requa, who is now located in New York City at the Hotel Commodore, was a speaker at the dinner given on April 25 in honor of Dr. Harry A. Garfield, Federal Fuel Administrator.

F. F. Sharpless left on May 3 for Sonora, Mexico, and will be absent for something like a month. Mr. Sharpless, by the way, writes to the *Engineering and Mining Journal* for May 10 calling attention to what has been done by the mining profession to assist in the revision of the Federal mining laws.

Morril B. Spaulding writes to the Secretary that he is now in Cuba where he will remain indefinitely.

H. H. Stout, Lieut.-Col. of Ordnance, has been discharged from the service.

Whitman Symmes is manager of the Consolidated Virginia and Ophir mining properties in California.

J. B. Tyrrell has been elected to the Council of the Institution of Mining and Metallurgy.

G. D. Van Arsdale is co-author of an article entitled "Copper Smelting Slag from the Microscopic and Chemical Point of View" published recently in the *Engineering and Mining Journal*.

A. P. Watt contributes an article on the "Economics of Concentration" to the *Engineering and Mining Journal* for May 3.

C. M. Weld is again located in New York and has temporary offices at 2 Rector St. His work in Washington in connection with the War-Minerals Investigation has been completed.

Harry J. Wolf has been on a professional trip to Arizona.

## MEMBERS OF THE SOCIETY WHO HAVE BEEN CALLED INTO THE SERVICE OF THE U. S. GOVERNMENT AND THE ALLIED ARMIES.

Lawrence Addicks.....Member, U. S. Naval Consulting Board  
Ralph Arnold.....Member, Board of Tax Reviewers  
P. R. Bradley.....Federal Food Administrator, Alaska  
Reginald W. Brock.....Major of Canadian forces  
Alfred H. Brooks.....Lt. Col., Engineers, A. E. F.  
Gelasio Caetani....Capt., 1st Reg. of Engineers, Italian Army  
J. Morgan Clements....Bur., Foreign and Domestic Commerce  
Benedict Crowell....Major, Engineers; Asst. Secretary of War  
J. S. Douglas....Maj. and Dir. Warehouses, American Red Cross  
Francis Drake.....British Aircraft Production Department



## MINING AND METALLURGICAL SOCIETY OF AMERICA

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A. S. Dwight.....Major, 11th Engineers, A. E. F.  
Herbert C. Hoover.....U. S. Food Administrator  
D. C. Jackling.....Dir., U. S. Explosives Plants  
Donald M. Liddell.....Capt., Aviation Sec., Signal Corps  
Charles W. McMeekin.....Major, General Staff  
C. H. Macnutt.....Lt. of Engineers in Canadian forces  
W. W. Mein.....Assistant Secretary of Agriculture  
J. W. Mercer.....American Red Cross  
C. W. Merrill....Div. of Chemicals, U. S. Food Administration  
H. G. Moulton.....Chief Examiner, War Finance Corp.  
O. B. Perry.....Lt. Col., 27th Engineers  
Joseph Hyde Pratt.....Col., 105th Engineers, A. E. F.  
A. L. Queneau.....Officer Interpreter, French Army  
M. L. Requa.....Chief of Oil Div., U. S. Fuel Administration  
Edgar Rickard.....Acting U. S. Food Administrator  
W. L. Saunders.....Chairman, U. S. Naval Consulting Board  
Millard K. Shaler.....Hon. Sec., Com. for Relief in Belgium  
J. E. Spurr.....Executive, Minerals Investigations  
S. A. Taylor.....Tech. Advisor, U. S. Fuel Administration  
Arthur L. Walker..Con. Met., Inspection Div., Ordnance Dept.

### DIED IN THE SERVICE OF THEIR COUNTRY.

William Hague.....January 1, 1918  
J. D. Irving.....July 20, 1918

# Mining and Metallurgical Society *of America*



Bulletin Number One Hundred Thirty-three  
June 30, 1919  
Vol. XII, No. 6

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## OFFICERS FOR 1919

*President*, H. H. KNOX, 17 Madison Ave., New York.

*Vice-President*, F. F. SHARPLESS, 17 Madison Ave., New York.

*Secretary-Treasurer*, LOUIS D. HUNTOON, 115 Broadway, New York.

*Executive Committee*, MESSRS. H. H. KNOX, LOUIS D. HUNTOON, W. R. INGALLS, R. A. F. PENROSE, JR., F. F. SHARPLESS.

## COUNCIL

At large, ex-officio,

H. H. Knox, New York.....Retires January, 1920

F. F. Sharpless, New York.....Retires January, 1920

Louis D. Huntoon, New York.....Retires January, 1920

Districts 1-2-3-4, New York, New England, and Eastern Canada.

W. R. Ingalls, New York.....Retires January, 1922

J. V. N. Dorr, New York.....Retires January, 1921

Pope Yeatman, New York.....Retires January, 1921

W. Lindgren, Cambridge, Mass.....Retires January, 1920

District 5—Pennsylvania.

R. A. F. Penrose, Jr., Philadelphia.....Retires January, 1920

District 6—Ohio, West Virginia, Maryland, Virginia, North Carolina, District of Columbia, and New Jersey.

R. M. Catlin, Franklin, N. J.....Retires January, 1920

District 7—Minnesota, Wisconsin, Michigan, Iowa, Missouri, Arkansas, and Kansas.

E. B. Kirby, St. Louis, Mo.....Retires January, 1920

District 8—Colorado, Utah, and South Dakota.

R. C. Gemmell, Salt Lake City, Utah.....Retires January, 1921

Districts 9-10—Northern California, Nevada, and Alaska.

Albert Burch, San Francisco, Calif.....Retires January, 1920

F. W. Bradley, San Francisco, Calif.....Retires January, 1921

District 11—Southern California, Arizona and Texas.

Ralph Arnold, Los Angeles, Calif.....Retires January, 1922

District 12—Washington, Idaho, Oregon, Montana, and Western Canada.

C. W. Goodale, Butte, Mont.....Retires January, 1922

## OFFICERS OF SECTIONS

### SAN FRANCISCO

Frank H. Probert,  
*Chairman.*

Edwin Letts Oliver,  
*Sec.-Treas.*

### NEW YORK

S. H. Ball,  
*Chairman.*

J. V. N. Dorr,  
*Vice-Chairman.*

F. F. Sharpless,  
*Sec.-Treas.*

### PHILADELPHIA

R. H. Sanders,  
*Chairman.*

DOUGLAS, ARMITAGE & McCANN, New York, Counsel for the Society.



# Mining and Metallurgical Society of America

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June 30, 1919

Bul. 133

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## ANNOUNCEMENTS.

**New York Section.**—A meeting of this Section was held at the Columbia University Club on Thursday evening, June 5, 1919. As indicated in the May BULLETIN, the program called for a continuation of the discussion of the labor question.

Messrs. Crane and Ingalls were the formal speakers, the latter, in particular, sticking closely to the especial subject announced for the meeting—"Economic Aspects of the Labor Situation."

Elsewhere in this issue a full report of the meeting will be found.

**Amendments to the By-Laws.**—The members should bear in mind that the polls for the referendum on the proposed amendments to the by-laws close at noon on July 19. This warning applies equally to the referendum on the resolutions regarding conditions in Mexico.

**Bound Volume.**—The bound volumes of the BULLETIN for 1918 (Vol. XI) will shortly be sent to the members who have placed orders with the Secretary. It should be announced that the constitution, with by-laws, etc., usually included, has been omitted from the bound volume in this instance. It was deemed inadvisable to reprint previous issues, stock of which has been exhausted, in view of the fact that the by-laws are at present in process of amendment.

## RESOLUTIONS BY THE SOCIETY.

As announced in the last issue, the Council on May 1, which was shortly after the published reports of the lamentable death of E. L. Dufourcq, determined to take formal action with especial reference to this cold-blooded murder of a member of

the Society and in general regarding the deplorable conditions in Mexico, which exist today and have been prevalent for a number of years.

In order to make this action effective, the Executive Committee was empowered to draft suitable resolutions, utilizing those which had been submitted to the Council as a basis, with the ultimate object of submitting the question to the membership for a vote. This was done, and the resolutions printed below were mailed in ballot form to the members on June 19.

WHEREAS their professional duties frequently call American mining engineers to Mexico and

WHEREAS the modern mining industry of Mexico has been mainly developed by American engineers and

WHEREAS many American mining engineers have suffered indignities, the loss of their property and even of their lives while travelling or sojourning in Mexico in the peaceful pursuit of their business and

WHEREAS such conditions have culminated in the murder at Teziutlan, on April 16, 1919, of Edward L. Dufourcq, an able and highly esteemed mining engineer and a member of the Mining and Metallurgical Society of America, therefore be it

RESOLVED that the Mining and Metallurgical Society of America hereby protests to the Department of State in Washington against further disregard by the American Government of conditions in Mexico that make it unsafe for American engineers to go there in the practice of their profession and for the care of business interests intrusted to them, and be it further

RESOLVED that the Mining and Metallurgical Society of America urges the American Government to take prompt and effective steps toward the establishment of such law and order in Mexico as will safeguard the persons and property of our citizens and extend its protection to all Americans in any part of the world to which they may be called in the pursuit of their legitimate affairs.

## COMMUNICATIONS.

**H. H. Knox.**—In pursuit of our undertaking to review and criticize the mineral industry in its present transitory stage with a view to constructive reform or toward the promotion of its evolution, it were well to overlook no longer the very foundation on which progress is erected, namely education. In furtherance of the end, the Council has authorized certain committees to take under consideration vocational, technical and post-graduate education and also the relation between these departments and military training.

Among various aspects of the subject the utilitarian conception of education as a manufacturing process demands attention especially from engineers. The raw material is presented to the schools which after due elaboration deliver the more or less finished article to the consumer, that is to the employer. Hence unless the consumer makes known from time to time his estimate of the product, he is doing less than justice to himself, to the manufacturer and to the commodity. Herein lies

the opportunity for members of the Society individually to express their views and thereby assist the committees to formulate conclusions which will eventually lead to a collective pronouncement by the Society.

Unless the signs of the times are deceptive the final struggle between the powers of socialism and individualism is close at hand and there can be little doubt which of the contending hosts will triumph if vociferous and aggressive propaganda is opposed by no force more vigorous than a vague and inarticulate disapproval.

The dogma of socialism, of which the essence is Equality of Reward, is being disseminated broadcast by journals, periodicals and pamphlets, from schools and from platforms, while the principles of individualism with its watchword of Equality of Opportunity are gathering dust on library shelves or finding utterance in the species of review not commonly displayed on the news stands. The flaming torch of a decade ago is flickering and must be rekindled if it is not to be snuffed out altogether by the prevalent blast of false doctrine.

Granted that individualism accords with the laws of human nature while socialism is rooted in human and economic fallacy there can be no question of the dominance of truth in the long run, but we are concerned with our own generation, not with the centuries to come. Therefore unless the truth be proclaimed now it may go by default and civilization, overcome by the cataclysm, be left to recover itself by inches as it was when the Western Empire collapsed fifteen hundred years ago. Education alone will save the day and education must begin at home. The man today who has not settled in his own mind whether he is an individualist or a socialist stands on a level with one who has not decided whether he is a believer or an atheist. Between the two poles there is no middle way, for the compromise between plus and minus is zero.

The whole significance of the equality of opportunity was contained in Bonaparte's assurance to his army that every humblest soldier carried a marshal's baton in his knapsack and this was no idle blarney in an age when courage and aptitude alone were sufficient qualifications for the highest rank. In this more complex epoch, to be sure, Private Lefebvre would be mustered out of service not as Marshal of France but as top sergeant for the reason that his peasant's education fell short of the requirements even for a commission.

As in war, so in industry the increasing demands on science make it ever harder for the ablest to rise to the surface without the benefit of professional training, and this constitutes a difficulty which must be overcome if the individualist is to behold the fulfillment of his ideal that opportunity shall be equal for all—that with a fair field and no favor every man shall have the same chance to mount to whatever eminence his natural abilities may entitle him to occupy. Such a consummation would not only satisfy the sense of justice but by broadening the field from which talent may be selected it would promote the efficiency of industry and the welfare of society.

If then an ideal is an aim which cannot be attained but can be approximated, we may well turn from the contemplation of perfection to the practical task of planning the approach.

The subjective education to which allusion has been made can bear fruit only when applied objectively, for the situation requires revision from top to bottom with a view to the substitution of *system* for *laissez faire*.

At the present time in America education in mineral technology



is provided by a course of instruction at a higher technical school while all above and below this grade is ignored. It is demanded of us as engineers that we pronounce upon the question whether such instruction is adequate to the requirements and, if not, how it may be modified the better to prepare a young man for his career. Furthermore we should consider whether the usual courses may advantageously be supplemented in exceptional cases by post-graduate studentships such as are provided under the auspices of the Institution of Mining and Metallurgy.

In general the common laborer is placed on the lowest rung of the ladder and left alone to climb as best he can regardless of the fact that a little help from above would materially promote his productive capacity. Would some method of vocational training such, for example, as the application of the Smith-Hughes Act in Idaho, be worthy of general adoption? In all the more advanced countries of Europe mine foremen are especially trained by the state. Do we neglect such education because it is in disaccord with American conditions or is it because we have never awakened to its possibilities?

These are questions which can be decided only by the directors of industry as the sole qualified critics of the human material supplied to them, and when they have been answered there is presented the final query: Is it within the bounds of practicality so to co-ordinate these various departments of education as to make it possible and natural for every man of the requisite moral and mental endowment to rise from the bottom of the scale to the top? Will it become possible to assure the working man in all good faith that "he carries a marshal's baton in his knapsack"? To this an affirmative answer would benefit alike the industry we represent and the democracy we profess.

**U. S. Bureau of Mines.**—Late in the month of May an invitation, signed by Director Manning, was received by the Society to co-operate in the dedication, on September 29, 30 and October 1, of the new buildings of the Pittsburg Experiment Station of the Bureau of Mines. Postponement of this ceremony had been made necessary by war conditions.

To make it clear for what purposes these buildings have been erected, the following paragraph from the official announcement may be quoted:

The buildings of the Bureau of Mines, erected at a cost of over half a million dollars, have been completely equipped for the investigation of the various problems relating to greater safety and efficiency in the mining and metallurgical industries. A visit to and an inspection of the Pittsburg Experiment Station offers much of interest to the technical man. Worthy of particular attention are the electrical and mechanical workshops and laboratories the petroleum, gas, and coal laboratories, and the testing galleries of the Mine Safety Section and the industrial gas-mask research division. In the buildings a remarkably complete exhibit representing the mining and metallurgical industries is being installed.

In connection with this dedication, first-aid and mine rescue contests, for which elaborate rules have been issued, will be held. It is understood that 50 teams have already been entered.

In concluding his invitation, Mr. Manning expresses the wish that the Society should send "as large and representative a delegation as possible."

## OTHER SOCIETIES. ENGINEERING COUNCIL.

**Public Works Department.**—Since the receipt of Mr. Channing's report as delegate from the Society to the Chicago Conference of Engineering Societies, the draft of a bill has been prepared to further the recommendations of the conference in the matter of federal public works.

A copy of this draft has been sent to the Secretary by Mr. Channing, who, in his letter of transmittal (June 9), indicates that approval by the Society of the action taken by the conference would be desirable.

This proposed legislation was introduced in both Houses of the Congress on June 25. The bill is too long for inclusion here, but, in lieu of it, the summary prepared by the National Service Committee of the Engineering Council is printed below, and will serve the purpose for the present at least. It should by the way be noted that the Committee on Text of Bill has made one decidedly important change, in that the conference resolution called for the establishment of an additional department whereas the draft of the bill proposes that the Department of the Interior shall hereafter be designated as the Department of Public Works.

The federal Department of the Interior will become the Department of Public Works, if the legislation proposed is enacted. The main idea is to assemble all engineering activities of the Government in one department.

Such bureaus of the Interior Department as are non-engineering in character are to be placed under the jurisdiction of appropriate departments, while engineering bureaus from other departments are to be included in the Department of Public Works. The bill proposes that the Patent Office is to be removed from the Interior Department and placed under the Department of Commerce. The Bureau of Pensions is assigned to the Department of the Treasury. The Bureau of Education goes to the Labor Department. The Bureau of Indian Affairs also is transferred to the Department of Labor, with the proviso that the engineering and construction work and the land and mineral surveys now performed under the direction of the Bureau of Indian Affairs are to be prosecuted under the Department of Public Works. St. Elizabeth's Hospital and the Freedman's Hospital in this city (Washington) are assigned to the Treasury Department. Columbia

Institution for the Deaf and the Howard University go to the Bureau of Education, under the provisions of the bill.

On the other hand, the Department of Public Works is slated to absorb the Supervising Architect's Office of the Treasury Department; the Construction Division, River and Harbor Improvements, Mississippi River Commission, and California Debris Commission of the War Department; the Bureau of Standards and the Coast and Geodetic Survey of the Department of Commerce; the Bureau of Public Roads and the Forest Service of the Department of Agriculture.

**Compensation of Engineers.**—It will perhaps be remembered that in April of 1918 the BULLETIN reported the activities of the Engineering Council in its endeavor to procure higher salaries for engineers in the service of the railroads. Now, under date of June 4, comes a report of the Committee on Classification and Compensation of Engineers, which was not organized fully until late in the spring of this year.

This committee divided its work into three sections, Federal, Railroad, Municipal and State, and by questionnaires and other means has gathered considerable data with reference to the compensation paid the salaried engineers in these different lines of work.

Except that the committee was also to report its recommendations as to the "course of action which should be pursued," its work was actually completed with the collection and analysis of this information. Wider powers have however been requested in order that the committee's investigations may be carried to a point at which "a definite classification for each of the services under consideration and a schedule of compensations which might reasonably be fixed for positions in each class" may be formulated.

In this connection, J. Parke Channing, in his capacity as Chairman of the Engineering Council, writes to the *New York Times* on June 16 concerning this question of an adequate competence for the professional man. Mr. Channing takes the occasion to point out that the years just past have shown the importance of the services of the engineering profession not only in war but also in peaceful pursuits.

## MEETINGS OF SECTIONS.

### NEW YORK SECTION.

**Meeting of June 5, 1919.**

The June meeting of this Section took place at the Columbia University Club on the 5th instant. This meeting was given



over to a further consideration of labor conditions to which the two previous meetings had also been devoted. The "Economic Aspects of the Labor Situation" was the especial phase of the general subject discussed.

After the customary formal dinner had been served, S. H. Ball, the chairman for the evening, introduced W. R. Ingalls as the first speaker. Mr. Ingalls was followed by Clinton H. Crane, after which the meeting was thrown open for general discussion.

The names of members attending follow: W. H. Aldridge, S. H. Ball, P. E. Barbour, C. C. Burger, R. M. Catlin, C. H. Crane, J. A. Church, Jr., A. E. Drucker, L. D. Huntton, W. R. Ingalls, W. Judson, A. F. Keene, H. H. Knox, J. V. Lewis, R. Linton, F. E. Pierce, F. R. Pyne, S. L. Rawlings, J. Roger, A. H. Rogers, E. M. Rogers, F. T. Rubidge, F. P. Sinn, W. A. Smith, A. M. Smoot, C. M. Weld, H. J. Wolf, L. A. Wright, P. Yeatman, G. J. Young.

The following guests were also present: C. S. Ackley, H. C. Enos, J. K. Erskine, H. Garlichs, M. C. Herring, F. E. Lee, S. Rolle, E. C. Thurston.

**The Chairman.**—Fellow-members: Some six months ago we were all greatly benefited by the exceedingly lucid presentation of the present economic situation by Mr. Ingalls in his speech as retiring President of the Mining and Metallurgical Society. As you are aware, this talk has been widely published in technical and in non-technical papers, and in addition has been used as one of the main topics by Mr. Gibb of The Institution of Mining and Metallurgy in London. Mr. Ingalls has kindly consented to give us this evening a continuation of or sequel to his remarks of January. Mr. Ingalls. (Applause.)

## THE RESIDUAL CLAIMANCY OF LABOR.

**Mr. Ingalls.**—The Committee on Economics of this Society will presently offer to the Council, for its submission to the membership, if it sees fit, the following declaration of views with respect to the economic position of labor in relation to other classes in the economic organization:

"There should be concerted effort to show labor, as it can be shown, that by sound economic theory labor is the residual claimant upon the produce of industry; that its residual claim in the United States is 70 to 80 per cent. of the whole; that statistics prove that labor gets it; that statistics show that as

mind increases the produce of mere manual labor, the latter gets the major part of the increment; that the part of the produce of industry that labor does not get, it cannot get by any economic means; that in trying to get by confiscatory means more than its residual share, labor not only does not get it, but also loses more or less of what it was previously getting as its residual share; that the only way that labor can get any more than it does now is to produce more; that slacking in any form, either by working full time at only partial efficiency, or by working only part of the time, is directly opposed to labor's own interest, and that labor is the greater sufferer thereby than anybody else."

This declaration is based on the economic theory that is known as that of the "residual claimancy." An essential condition of that theory is the state of free competition and the exercise of it. The more nearly perfect is the competition the swifter and surer is the operation of economic law in accordance with this theory.

In this connection it is important to pay attention to the revelation respecting the present policy of the labor leaders that Mr. Larkin made at the last meeting of this Section. In substance, he said that the labor leaders now do not want labor to share in the profits of business. They are afraid that if the workmen should begin thus to participate they would unconsciously become company men and the leaders would lose control of them. Now they say that the running of a business is the management's affair and that the management must pay proper wages. To small concerns that say they can not pay the wages demanded, that the business will not stand it, the reply is that such concerns have no right to be in business. Let the business be done by the big companies who know how to make money out of it and can pay the proper wages.

If you consider this carefully you will find something both humorous and portentous in it. The preachers of bolshevism and socialism (I discern scarcely any difference between these "isms") in this country may be divided into two classes, to wit, the I. W. W. gang who are simply out for plunder and the misguided sentimentalists, among whom are to be found a large number of college professors. Our colleges and schools simply reek with socialism. But besides the college professors there are capitalists, some of whom convey the impression of holding up their hands and crying "Kamerad" to the masses, and wealthy women, who confuse improvement of the social order with the theories of socialism and know not whereof they are talking or whither their fancies are leading. The leaders of organized

labor are under no illusions—they are not going to consent to any impairment of producing ability. They do not want any democratization of industry, no conversion of the workshops into debating halls. They want to preserve the existing organization of authority, they want the managements to produce more, by virtue of authority and even by combination and elimination of the weak producers, so that labor can get more. Organized labor is therefore, more or less unconsciously, conforming to the theory of residual claimancy, and there being nothing fallacious about this, labor will be pretty sure to win on this line. It will be perceived that the Committee on Economics of this Society intends to propose a declaration to labor with which organized labor in this country is already being harmonized, in principle at least, by its own leaders. This is a portentous development of thought, and I shall revert to it. The humorous aspect is the position in which the sentimental socialists and semi-socialists and unconscious socialists are left.

In his recent message to Congress, the President said:

There is now, in fact, a real community of interest between capital and labor, but it has never been made evident in action. It can be made operative and manifest only in a new organization of industry. The genius of our business men and the sound practical sense of our workers can certainly work such a partnership out when once they realize exactly what it is that they seek and sincerely adopt a common purpose with regard to it.

The object of all reform in this essential matter must be the genuine democratization of industry, based upon a full recognition of the right of those who work, in whatever rank, to participate in some organic way in every decision which directly affects their welfare or the part they are to play in industry.

Commenting upon the President's words, the *Evening Sun*, in an editorial May 22, under the caption of "A Death Blow to Large Industry," remarked:

Even Mr. Wilson has not said anything much more dangerous than this. A majority of Mr. Bryan's dreams were harmless by comparison.

Either the paragraph means that the Government shall impose trade union participancy in the management of industry on the country or it means nothing. It is either a plan or a platitude. If it is a plan, and if, by any misfortune, it should ever be put into force by the Congress, it would have a desolating effect on enterprise and business. It would drive capital into hiding and would reduce brains and skill to individualistic effort.

It is mere fatuity to imagine that any one possessed of large resources will ever hazard them upon the sweet will of human elements over which he has no control and whose interests are at least liable to be divergent from his own. All experience prompts the conclusion that concerns governed in such a manner would seldom or never succeed or even continue to operate for any prolonged period.



The inevitable result of such a system would be either the abandonment of all progress and a return to mediaeval methods of small unit industry, or else Government financing of every enterprise with all the ruinous extravagances and abuses which have been so richly illustrated in the last two years of our history.

The *Evening Sun* thus picturesquely portrayed a part of what would happen from the democratization of industry. All talk about such democratization as an ideal is nothing more than a dreamy expression of socialism. For the full revelation of results the direction of attention to the present state of industry in Russia is sufficient.

Dr. Charles W. Eliot, president emeritus of Harvard, an enlightened philosopher, whose advice is generally sound, recently made the following suggestions:

**A.** (1) Abandonment of every form of despotic or autocratic government in factories, mines, transportation services and other industries.

(2) Universal adoption of co-operative management and discipline throughout works or plants.

(3) Adoption by all corporations and individual owners of every means for promoting health and vigor of employees and their families.

(4) Careful provision in all large services of means for dealing promptly and justly with complaints of employees.

(5) Universal use in large services of well-trained employment managers.

(6) General adoption of a genuine partnership system between the capital and labor engaged.

(7) Constant effort on part of managers to diminish monotony and increase variety in occupations.

(8) Universal acceptance of collective bargaining through elected representatives of each side.

With regard to what employees should do, President Eliot suggested:

**B.** (1) Abandonment of doctrine of limited output.

(2) Abandonment of idea that it is desirable for workers of any sort to work as few hours as possible.

(3) Rejection of the notion that leisure rather than steady work should be the main object in life.

(4) Abandonment of two conceptions which underlie use of violence or force in winning victories in contests between employers and employees; (a) That capital is the natural enemy of labor. (b) That unorganized laborers are traitors to their class.

(5) Abandonment of all violence toward property or persons in prosecution of industrial disputes.

Mr. Eliot made the following suggestions to both parties in industrial strike:

**C.** (1) Willing adoption by both parties of methods of conciliation or arbitration.

(2) Recognition by both parties that a new danger threatens civilization.

(3) General acceptance of the view that American liberties are to be preserved just as they have been won.

(4) Acceptance of the truth that democracy which is to be made safe in the world does not mean equality of possessions or powers, but on the contrary, the free cultivation of diversified human gifts and capacity, and liberty for each individual to do his best for the common good.

There will be no dissent from Dr. Eliot's rational advice except as to his points A-1, A-2, and A-6.

The great question that confronts the industrial world today is a clear-cut issue between the residual claimancy of labor and the democratization of industry. The one is severely economic; the other is sociological. The clarification of minds on this subject will be aided if attention be withdrawn from side-issues.

The improvement of the welfare of the workers by better housing, by better hygiene, by giving them better places in which to labor, by alleviating their personal grievances, etc., is an important thing to attend to. There is no room for discussion about this, except as to ways and means. Employers ought to want to see this done even more than the workers. But if you think that by mitigating the hard lot of the workers in these ways, if you think that thus you are entering into the spirit of industrial democracy you are mightily mistaken. There is no mining district in the United States that is so agreeable in which to live as Lake Superior. There is no mining company that did so much for the welfare of its workers as did Calumet & Hecla. There was no employer in this country toward whom so great a spirit of friendliness was supposed to exist. Nevertheless, all of this did not prevent one of the ugliest strikes in the history of copper mining, when those people thought they ought to have higher wages than the company would pay.

The workers may appreciate friendliness, but what they want primarily is the highest possible wages, as they express themselves; but really what they want is the maximum of goods that they can get. The last thing that they want is the democratization of industry. Their leaders are intelligent enough to see that that would mean less goods. Their program is to drive employers to create more goods, of which labor as the residual claimant will get the bulk. But although it will get the bulk it will be dissatisfied if the total, the dividend, be too small.

The labor branch of the Peace Conference, in Paris, has drawn up a declaration of the rights of labor that hereafter is to be observed internationally. This declaration consists mostly of platitudes that do not mean much, but there is one that is grave, to wit, the dictum that every worker is entitled to decent living conditions. Nobody would wish anything to the contrary, but is not this statement merely another version of the old one that the World owes everybody a living? We ask, naturally, how and when the World contracted such an obligation and how is it to be enforced? How is anybody to get a decent living, or any kind of a living, if he does not earn it?

J. A. Hobson, one of the most versatile as well as most liberal of modern British economists, who was a member of the Whitly Committee is a staunch believer in political and industrial democracy but underestimates neither the difficulties of its attainment nor the tremendous problems involved in its successful administration. In his recent work "Democracy After the War," he warns the British proletariat that any effort to limit productivity can spell only disaster. Increase of production does not necessarily involve any painful or injurious intensification of toil; it may be accomplished by improved organization of labor and of industrial management generally. In no other way can the masses hope for a permanently improved standard of living. Hobson shows statistically that the pre-war income of England, if equally distributed, would not suffice to give the average family "the full requirements of a civilized modern life."

We are on the threshold, and only the threshold, of an era of economic readjustment in which we are going to see many important changes in industries. Troubles may be ameliorated and prosperity may be promoted if this be recognized. The world is emerging from too great a cataclysm for things to be soon as they were before.

I see the need for such transparency in industry for thinking in terms of each industry as a whole, and for industrial co-operation as never before. My thought of industrial co-operation is the very antithesis of the common expression of the day that the workers are going to have more to say respecting the conduct of industry. They do not want that any more than the soldiers of an army want to direct the strategy and tactics of a campaign. But just like the soldiers they are not going to be satisfied with bad generalship.

What is wanted, therefore, is better leadership and it is that which the directors of industries must arrange among them-



selves; and they must do it for the protection of their property and the promotion of their business. This is what I mean by industrial cooperation, which in its broadest economic sense is something that is to be sought practically among employers alone, and not between them as a group and their workmen as a group, no matter how much the participation of the latter is, theoretically, to be desired. (Applause.)

**The Chairman.**—The discussion of Mr. Ingalls' paper will be taken up a little later and I will now introduce Mr. Clinton H. Crane, President of the St. Joseph Lead Co. It has been the privilege, or rather the lot, perhaps, of many of us to work Chinese, Mexicans and negroes. Mr. Crane has had the privilege of working, very, very largely, a stock which is perhaps as pure American as that which exists anywhere, that of the mountain regions of Missouri. Mr. Crane. (Applause.)

**Mr. Crane.**—Mr. Chairman and gentlemen: I feel that anybody who has had to do with the employment of labor in this country or any other country has had to be largely an opportunist. I don't believe that there are any fixed or definite short-cuts in dealing with labor. No man that is worth anything is satisfied with what he is getting. I don't believe that any man in this room is satisfied with what he is getting and that is bound to be the case with labor in general. That is what gives the agitator his opportunities. He merely points out the fact that the owner or the officers or the managers get a great deal more and apparently do a great deal less, and that this is very unjust, and for that reason he always has a hearing. My own feeling, and the way we have met the situation in the mines and the mills of Missouri in the most effective way, is to try to arrange by contract system that the interest of the employee and the interest of the employer go together and that a man by using his brains can earn more money for himself at the same time that he is earning more for the company. Unfortunately, that applies to a limited number in Missouri. I should think that not more than 25 per cent. of our employees are able to benefit in that way, but that 25 per cent., who go home at night thinking how they can get out more tons of rock on their particular contract at so much a ton the next day, not only are a good thing for the company but they are a good thing for themselves. A man of that type has something interesting to think about when he goes to work in the morning and doesn't say, "I wish it was six o'clock and I could go home and get out of this place," and I believe the fact that we have had no serious labor trouble during the war in the mines proper was due very largely to the conservative in-

fluence of that element. We, of course, tried to anticipate trouble. When the price of lead advanced we followed it with a bonus system and usually satisfied our men.

The only bad experience we had, and that is very interesting as showing how labor leaders can hurt the situation and how the Government agent, a theorist, can hurt a situation, was the strike at our smelter in Herculaneum. There was a small union at Herculaneum, not a very strong union, at least we didn't regard it as strong, but outsiders came in and informed our men, who were largely from Washington County, Missouri, that the smelter had to run, that the United States Government would see that it did run, and that all they had to do was to strike and get any wages which they asked.

Now, we had always, and I suppose that is apt to be the case with profitable concerns—we had always been paying rather more than the market rate of wages. At this particular time we were paying probably 25 per cent. more than our neighbors, so that, when in March of 1918 the National War Labor Board was formed with a very nice set of principles, "that existing conditions would not be disturbed," that everything was to go on very much as it was and if there was a strike it was all to be left to the War Labor Board, we were very much impressed. We thought, here is a chance to see how a really definite plan will work out, here is a conservative, a particularly conservative, body formed which is going to come in and help us to settle our labor disputes. There is one particular clause in its program which I am going to read to you. You gentlemen are probably familiar with it, but it seemed so perfectly convincing to me that I fell for it:

"In fixing wages, hours and conditions of labor, regard should always be had to the labor standards, wage scales and other conditions prevailing in the locality."

Well, with that doctrine in front of me and with the fact that we were paying 25 per cent. more than our competitors I felt that the submission to arbitration by those gentlemen was just a formality, and that as soon as we should go before Mr. Walsh and Mr. Taft and show them our wages and show our competitors' wages they would say to us, "Gentlemen, you're a fine lot of fellows," and to our men, "You men ought to be satisfied to be working for such an organization," and they'd be sent right back to work. Well, we went through an arbitration, we went before the Board, which we found to consist of an advocate for labor as one of the judges and Mr. Taft as the other judge, and we were questioned about how profitable we were and what sort of a

minimum wage ought to be necessary for a family to live on, and all the little statements we made about what we were paying, what our competitors were paying and what the market rate of wages in our locality was, were brushed to one side. They went down into the record to be sure, but on the 31st of July, two months thereafter, we had a decision which gave the men a 40 per cent. advance over what we were already paying (Laughter), and in addition to that notified us that we should pay them double time for Sundays and holidays, the same being retroactive. We, of course, supposed that their idea was that a smelter could be shut down on Sundays, that it was probably better for the health of the men that they shouldn't work on the Sabbath and that they shouldn't work on holidays. Well, we agreed to that, it was better, but somehow or other a blast furnace doesn't work very well that way, and we explained to Messrs. Walsh and Taft that all the blast furnaces in the country were running seven days a week. Well, they said that was too bad but that when a man worked seven days a week he ought to have double time on Sunday. "But," we said, "the men don't work seven days a week, the man who works on Sunday has another day off." "Oh, but that doesn't make any difference, he still is entitled to double time for holidays and Sundays."

Now, I was perfectly convinced that this was all done by Mr. Walsh. Of course, we knew that Mr. Walsh was a very strong advocate of labor, we didn't expect him to be anything else, and as the only people who came to Herculaneum to investigate and check up the facts which had been presented at the hearing were Mr. Walsh's assistants in Kansas City, we supposed that probably Mr. Taft didn't know what was happening, that he was busy and happy, and so I thought I had better write him a personal letter which would let him know what his confrère was doing, so I wrote him:

As I understand it, you were supposed to represent the employers' end so far as a man with a judicial mind can (Laughter) in the hearings before the War Labor Board and for this reason I am writing you personally in regard to the hearing held before your Board in St. Louis on May 25th last.

I realize that you have been extremely busy since that time and our controversy is only one of many. I feel, however, I must bring certain facts to your attention. It was my understanding that a transcript of the hearing should be made by the stenographer (Mr. Walsh's secretary, I believe), and mailed to both sides of the controversy, so that they might check up the facts. I wrote in regard to this matter on June 5 and telegraphed on June 22. I enclose copy of my telegram and the reply which I received from Mr. L. S. K. Trigg.

On June 19 Mr. Thomas M. Finn called at Herculaneum with a partial transcript of the testimony given before your Board. He showed



himself by every action to be violently partisan in favor of the men's side of the controversy. He promised the men they would have the decision of the Board some time the following week and gave them the impression that they would surely get an increase. I cannot believe that you are aware of this promise.

Mr. Walsh is supposed by every one to represent labor on the Board and I suppose from his point of view it is quite proper that he should be partisan. It does not, however, seem to me that all investigations should be carried on by men who have a partisan outlook.

We could not possibly have submitted our case to the War Labor Board had we not supposed that it would receive *your* personal attention and that is all I am asking for.

I waited and waited and by and by I got a telegram from Mr. Walsh's secretary that this letter had been referred to him for attention. (Laughter.) After the decision was handed down I found that some other means of approach to Mr. Taft was necessary. Now, I am only an engineer and it occurred to me that if a fellow lawyer should go down to Washington and should go into his room behind closed doors, perhaps Mr. Taft might unbosom himself to that lawyer and tell him all about it; so I arranged that that should be done and Mr. Taft said, oh, yes, they realized that prevailing conditions should be observed, but to tell Mr. Crane that trouble would shortly arise in those other plants and those wages would be increased (Laughter). Well, you can see from our point of view that this method of settling a labor dispute doesn't seem to be quite a satisfactory method. We could have come to a settlement with our own men a great deal cheaper. It was the most expensive undertaking I ever went into and I am inclined to think that any such arbitration, be it by the War Labor Board or be it by any Board of Mediation, doesn't work well. The smelter at Herculanum is now shut down and will have to be shut down until Germany signs the peace treaty. In the meantime those men who were to have been benefited by all this have no work to do. We can't operate that smelter at the wages which were given to us by the War Labor Board's award and compete with the neighboring smelters. We are able to pay the neighboring smelters a very handsome charge for treatment and still save money over operating.

Another effect on the local labor was the absolute removal of any sense of discipline and obligation. The War Labor Board supplied us with a kind of thing it called examiners, although wages was the only question left to their discussion, and these men were supposed to come down and tell us just what to do in cases of differences of opinion. Now, one of the men called our general manager a liar. At least, the expression used would lead me to suppose that that is what he meant (Laughter), and it was impossible—you gentlemen who have had men under you

realize that it was quite impossible—that we should continue to employ that man, but the examiner didn't think so. Now, I would like to read you what he says about it. He orders us to put the man back to work, and then says:

In explanation of the basis upon which this decision is founded I will mention the fact that Mr. Mitchell was serving as a regularly elected member of the grievance committee at the time he remarked to the general manager that "I wouldn't believe you as far as I could throw a blast furnace." (Laughter.) Acting on this committee he was protected by the principles of the National War Labor Board (Laughter) which guarantee the right of employees to bargain collectively. These principles state further that there shall be no discrimination or coercion directed against the proper activities of this line.

But, I do believe that we have all of us got to find some way of getting into closer touch with our men, and, seriously, the most hopeless feeling I had with that strike was in not having anybody that I could talk to with any idea that it would get home to the body of men.

The strike occurred in one of the worst parts of the war. It was not a question at all of a few dollars of wages one way or the other. Lead was so much a necessity that, whatever the cost, it would have to be produced. Our object was to get the plant running and keep it running. Experience elsewhere in the country had shown that continued increases in wages had not accomplished this result. The very high wages beyond what other people were paying would first result in a large increase in the number of idle men seeking jobs who would hear of the good wages and leave their existing jobs to seek others and we hoped for constructive help along this line of thought from the War Labor Board. There is a great tendency at the present time among employers to feel that unionism has come to stay and that it is best to recognize it at once and to help the unionization of their own plants. The great trouble with recognizing and helping existing unions is the strong belief held by almost all labor leaders that the greatest prosperity for labor lies along the line of curtailment of production. England shows this most clearly and it shows also that when the conservative labor leaders have come to the end of their rope they are ousted and their places taken by the radical element.

I quite agree with Mr. Ingalls in what he says about labor being the residuary legatee, but the estate which is to be divided is not a fixture. The size of the estate is dependent in part on the energy with which the men work, but to a great extent to the ability with which their work is directed. If a plant is well run, as you all know, it will make money for everybody. If badly

run, the men may work harder and not produce so much. My own belief is that the only way we can get the best run plant is by the combined brains of our thousands of employees. You must make everybody think from the general manager down, and get rid of the idea that there is any one on the job who is "not paid to think." In a small way, I think we have partially solved this problem in the mines of Missouri. (Applause.)

**The Chairman.**—The two talks of the evening are open for discussion.

**Mr. Knox.**—It seems to me that clear thinking is dependent on a precise definition of the terms used in the discussion and this especially applies to that term, "the democratization of industry," which is in current use. We meet it every day. This question of labor is a branch of the general subject of economics and economics is a dismal science. I don't think that the members who have attended the last two or three meetings of the New York Section will agree that it is a dismal science, on the other hand it has that reputation and perhaps that is what has frightened away a great number of people from this study.

The democratization of labor is carelessly used. It is impossible of attainment and therefore is an absurdity, and if it were appreciated that it is an absurdity it wouldn't be used as carelessly as it is. I therefore think that the Committee on Economics would be doing a real service if it would supply a term which would describe what people really mean when they use that term, "the democratization of labor." What they really mean is the humanization of labor, or Heaven knows what not. But it isn't that, and therefore I think that that would be one service that the Committee on Economics would be able to perform—to supply a term to the general public which would describe what it really means when it uses that language. (Applause.)

**The Chairman.**—The subject is open for discussion. Mr. Deacon, I'd like to hear of some of your experiences across the Hudson.

**Mr. Deacon.**—I do not think that I am prepared to say anything that would really contribute to this discussion. I have appreciated very much what Mr. Crane has said, because we were up against a very great many problems of a similar kind during the war, only we fortunately didn't get up against the War Labor Board. We were afraid that we might have to but we managed to keep away from it and, judging from Mr. Crane's experience, I think we were very lucky.



We were, however, involved in a ring-around-a-rosy in which, as Mr. Crane described it, if you gave in every time it would simply have been a continuous performance, and yet all our neighbors were scrambling to give in so rapidly that every time they did we were carried along in the general current. We were only able to keep from getting the wheels of progress blocked by the very fact that we were continually digging down.

However, I came here tonight to listen and not to talk and I do not feel that I have got very much to tell you on the general subject before the meeting.

**The Chairman.**—Mr. Catlin, have you not something to offer?

**Mr. Catlin.**—I don't know much more than the rest of you on this subject. I think Mr. Crane has possibly hit the same experience that most of us have. The millenium, if such thing there be in labor matters, probably lies along the road which I understand he has indicated. I don't believe that any War Labor Board created by man, much less by government (Laughter), is liable to bring about that happy day. Capital and labor seem in much the same fix as the proverbial Kilkenny cats tied together by their tails over a clothes line. They can't separate, therefore they will ultimately have to agree.

Now, in my own limited sphere of observation, it occurs to me that when I can get a body of men around me that want to do what I want to do we are likely to accomplish our purpose. We had an experience in 1911. All at once out of a clear sky, without the slightest provocation as far as I know, I was advised that there was a strike on and that there were armed men at the gate not letting the rest of the men go in. Shortly there appeared a committee and I asked its members who they represented. They said, "The men." I said, "Do I understand, then, that any arrangements that you and I shall make will be all satisfactory?" "Well," they said, "of course we will have to report to the men." Then I said, "Then you don't represent anybody as yet. In the first place, I do not know what the trouble is, but in any case I'd like to feel that I am dealing with somebody that is representative and somebody that has full authority." Well, that assurance they said they couldn't give. I said, "Well, then, if you do not represent them I'd like to talk to them and find out what the trouble is." So, it was arranged that at 6 o'clock the next morning I should talk to them.

I asked them, "What's the matter, boys; what's the trouble?" They shouted, "Uni, uni, uni!" What was "uni"? Well, it was I. W. W., and it was Moyer and Haywood. Now, I

wasn't personally acquainted with either of those men but I knew enough about them to feel warranted in the statement I made. They said it was the Western Federation. I said, "I know they don't care a hoot about you and if you follow them and they lead you on and they lead you into trouble and they can make a good square collection they will fly away and leave you holding the bag. Now, if there are enough of you fellows that want to serve under Mr. Moyer and Mr. Haywood I expect likely you will have to do it, but I won't work with them, I won't try it. I believe that there is no use trying to work with them." They replied that they wanted me to stay but they wanted "uni." Well, of course, they really didn't know what they did want. However, there were a lot of fellows among the men who had worked for us a long time. They had worked with us long enough to know that they got a square deal so far as our lights allowed us to give such a thing, and they knew our Yea was Yea and our Nay was Nay, and, moreover, many of them had been born in the neighborhood, they had their homes there, they had their interest there and they knew jolly well they hadn't anything to complain about. I said, "It is up to you fellows." Now, what really happened neither the company nor myself had anything to do with at the culmination of that trouble. The people thought it out. The men thought it out themselves and they said, "Look here, you fellows that don't like to continue here, we are perfectly well satisfied to stay here, and we are going to stay, and you get out"; and they took several of them down to the train and they left, and we haven't had any more trouble since. Of course, they told us what they were going to do to us, but they went to some of our neighbors and the neighbors have been in trouble more or less ever since, and I understand that these neighbors have been through some such experience as Mr. Crane went through. They went to the War Labor Board and they got the same decision that Mr. Crane did.

But I think the way to happiness, if there is such a thing in this line, is to give your men a square deal, not that you must raise their wages all the time, because that is a sort of merry-go-round, there is no end to it, but what I believe is—I speak personally—interest the men, let them form committees on various things for improvement. I'd like to have them take some of the worry, some of the trouble, some of the responsibility. If you can only instil into a man's mind that he has some responsibility you elevate him and you make him a helper instead of a hindrance. If you can make him feel that he is part of a going concern, and that upon his shoulders devolves some of the responsi-

bilities for the rewards of its success, many difficulties would be avoided.

Now, that works out but it isn't an awfully easy thing to do. It is a theory that you have got to prepare the way for, before you can bring it about in practice, but if you can get your men's confidence—and before you get their confidence you have got to deserve it or you won't keep it (and you don't have to say "Yes, yes" all the time)—by and by, if you can get them to feel that your "No" is a just one and you have got a good reason for it, I don't think I am speaking beyond the mark in predicting that more than 60 per cent. of them will back you up. After they have once found that you were warranted in your decisions by and by the percentage will be greater.

Now, can you get them to work with you? Of course, you have something else to consider, and in this case it is this walking delegate fellow. He has got nothing to gain by peace, he is the carrion bird that lives upon trouble. I once wanted to go from San Francisco to Berkeley and I found I couldn't go—the trains weren't running. There was a strike. Nobody seemed to know what the strike was about, but it was in the East. It seemed that it started, queerly enough, in the plant of the man who had, up to that time as far as I know, the broadest idea of helping his men. He had selected a piece of ground and built houses, the like of which the men had never dwelt in, had rented them to them at a price they couldn't begin to get elsewhere, had furnished them with all kinds of unheard of improvements. George M. Pullman had lived in a delightful community and all at once some fellow came along, a walking delegate I presume, got hold of somebody in the mattress factory and told him, "You're slaves, you fellows are slaves. Why, there is a capital 'P' printed on all you fellows. Where do you live? Do you live in your house? Not you. Who owns the house? George M. Pullman. Well, can you buy it? Suppose you want to change a window into a door or a door into a window. Can you do it? No, sir. You're slaves, I tell you you're slaves."

Well, bless me if he didn't make them think so, not only made them think so but the infection spread until it got to Chicago (I think that was in the Cleveland administration if I am not mistaken) where the militia was called out. They borrowed the militia's guns and sent them home; and then Mr. Cleveland took hold and sent the regular army and it don't know any more than to fire when told to do so, and it did it and raised the dickens, but the thing passed into history.

Now, I mention that merely to show that however carefully



you work, you have got to be continually on the watch for that thing which has always existed and I suppose always will exist, the mischief-maker. There are some people in the world whose vocation, it seems, lies entirely along that line and some seem to be inspired in that. I do not know that anybody is ever inspired on the other side, but I do believe that if there is any way to success it is along the lines of getting your men to work with you—to get the interest of the men with you. Don't give them moral pocket handkerchiefs and jew's-harps and bicycles and all this, don't give them what they do not want, always give them justice and insofar as possible make their cause your cause. Stimulate a civic pride if you can, stimulate an interest in the home.

Probably all of you have the same troubles, but the word "house" kind of shocks my ears. I do not like houses. I think it ought to be prohibited by law for a company to own a house. If your men can own their houses they have got a stake in the ground. One great benefit of this war is the bond. Lots of fellows have got bonds who never had them before and lots of men have accounts in the savings banks who would never have had them if they hadn't taken bonds, and they wouldn't have taken bonds unless it had been a popular measure. There are savings bank deposits being started today which were never started before and that makes for good. The reason I do not think that this Bolshevik movement will succeed very far in this country is because it is a direct attack on homes. The savage man in the days of the cave-dweller would fight for his home and the human being today that won't fight for his home doesn't deserve to have one. Get your men to own their homes, get them to have a living interest in their prosperity. As you evince a living interest in their prosperity, by and by, if you can stimulate that feeling, you will build up a wall that no Bolshevik or no I. W. W. can ever get over, because just as they did in 1911 they will escort them to the train and say "Good night." (Applause.)

**The Chairman.**—We have had a number of talks on the effect of the war in England and on the effect of the war on the laboring man of France. I wonder if Mr. Drew, who I think is just back from Peru, can tell us something of what the effect of the war has been on labor in South America.

**Mr. Drew.**—Mr. Chairman and Gentlemen: I have the pleasure of having with me tonight our general manager, Mr. Rawlings, whom some of you know and of whom I am sure all have heard. I think he is very much better qualified to talk about our conditions than I am. I take pleasure in introducing him. (Applause.)

**Mr. Rawlings.**—Mr. Drew mentioned to me this afternoon as we were going out to the golf links that it might be very well to come back to this meeting, so I am totally unprepared to say anything that would be of interest.

Our labor condition in Cerro de Pasco is usually quite the reverse of anything in the United States. When the enterprise was started about nineteen years ago the company had to deal with a very low grade of Cholo laborer. The Indian of Peru is a very primitive person. He mainly subsists on grain and potatoes, so that the living conditions, when one speaks of them in the sense that has been mentioned tonight, the living conditions of the Cholo are very different from those of labor in this country or in any other country that I know of.

The common laborer in Peru formerly received from 60 centavos to 80 centavos a day. I think there is no doubt that the price of commodities was in keeping with that, and, even in the lower country, he receives about that at the present time. At the mines of the Cerro de Pasco Copper Corporation the lowest wage that is paid at the present time is one sol sixty centavos, which corresponds to about 80 cents in our money. The average wage of the Peruvian in all of the camps will probably be about two sols fifty centavos, or \$1.25 in our money. That, of course, is a great deal more than they received before but the price of commodities has gone up and they have felt some hardship from the war.

I regret very much that I don't recall the cost of prime necessities in Peru at the present time, but about a year ago we had a movement that threatened strikes and, in order to forestall it, we established at all of the camps mercantile establishments where these men could get prime necessities at and below cost and in that way we protected them against a further rise in their needs. It seems to me that the standardization of labor throughout the world is going to be a very difficult matter when one considers

the needs of a high-class miner in this country and, at the other extreme, the needs of a low-class Cholo like the Peruvian. Thank you. (Applause.)

**The Chairman.**—Is there any further discussion? Mr. Aldridge, Mr. Ingalls suggests that you may have something to say.

**Mr. Aldridge.**—After Mr. Ingalls' remarks about the Bolshevik I can see that I have no show at all.

**The Chairman.**—I think a little difference of opinion, Mr. Aldridge, might very, very well help things out. If you can give us any Lenine statements we'd be very pleased to listen to them.

**Mr. Aldridge.**—I'd have to talk to him privately first. I have no remarks at all.

**The Chairman.**—If there is no further discussion a motion to adjourn is in order.

The meeting thereupon adjourned at 9:30 p. m.

F. F. SHARPLESS,  
*Section Secretary.*

## CHANGES OF ADDRESS.

Austin, L. S. . . . . 428 West 5th South St., Salt Lake City, Utah  
Bancroft, Howland. . . . . Crocker Bldg., San Francisco, Cal.  
Caetani, G. . . . . Palazzo Caetani, Rome, Italy  
Clevenger, G. H. . . . . Room 1603, 29 West 39th St., New York  
Parsons, Floyd W. . . . . 32 West 40th St., New York  
Smith, Wm. Allen. . . . . Nonquitt, Mass.  
White, R. T. . . . . Casilla 12, Valparaiso, Chile  
Wolf, H. J. . . . . Rocky Mountain Club, 65 West 44th St., New York

## PERSONALS.

R. C. Canby contributes an article to the *Engineering and Mining Journal* devoted to the U. S. Supreme Court decision in



the case of Minerals Separation, Ltd., vs. Butte & Superior Mining Co.

James S. Douglas has been making an inspection of mines and smelters at Jerome.

Charles Verner Drew has returned from his professional trip to Peru. S. L. Rawlings arrived at the same time.

J. R. Finlay contributes to the *Engineering and Mining Journal*, for May 31, an article entitled "The Geology and Economics of Coal."

R. C. Gemmell was one of a party of business men which recently investigated the resources of the Uinta Basin in Utah to determine whether railroad construction to that district is needed.

W. R. Ingalls gives the "Spelter Statistics for 1918" in the May 31 issue of the *Engineering and Mining Journal*.

D. C. Jackling has been making an inspection of the mines and plant of the Ray Consolidated Copper Co., of which he is the president.

Edward Keller has left New York for Colorado where he will be located for the summer months.

D. A. Lyon in his capacity as supervisor has been in the Northwest on a tour of inspection of the U. S. Bureau of Mines experiment stations.

J. F. McClelland has become a member of the staff of the Liberty National Bank; his position will be that of consulting engineer.

J. W. Mercer, who has been abroad for many months in behalf of the American Red Cross, has been appointed commissioner to Switzerland for that organization.

Floyd W. Parsons, who from its foundation has been editor of *Coal Age*, has resigned this position to become connected with the *Saturday Evening Post*.

M. L. Requa has resigned from his position with the Federal Fuel Administration. He has associated himself with the Sinclair Oil interests.

W. L. Saunders was one of the speakers on May 22 at the presentation to General George W. Goethals of the John Fritz medal.

F. F. Sharpless writes from Nogales, Arizona, to the *Engineering and Mining Journal* for June 7 to describe conditions as he found them in Sonora, Mexico.

Arthur Thacher visited New York and Boston in the latter part of May.

J. B. Tyrrell has been examining gold properties in the Kirkland Lake district.

A. P. Watt, who has been in Colorado on a business trip, is now back at his office.

Harry J. Wolf, as the representative of the Colorado Scientific Society, is a charter member of the Colorado Engineering Council organized at Denver in April last.

George J. Young is the author of "Control of Ore-Dressing Operations," appearing in the *Engineering and Mining Journal* for May 24.

# Mining and Metallurgical Society *of America*



Bulletin Number One Hundred Thirty-four  
July and August, 1919  
Vol. XII, No. 7

Published at the Office of the Secretary  
115 Broadway New York



## OFFICERS FOR 1919

*President*, H. H. KNOX, 17 Madison Ave., New York.

*Vice-President*, F. F. SHARPLESS, 17 Madison Ave., New York.

*Secretary-Treasurer*, LOUIS D. HUNTOON, 115 Broadway, New York.

*Executive Committee*, MESSRS. H. H. KNOX, LOUIS D. HUNTOON, W. R. INGALLS, R. A. F. PENROSE, JR., F. F. SHARPLESS.

## COUNCIL

At large, ex-officio,

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F. F. Sharpless, New York.....Retires January, 1920

Louis D. Huntoon, New York.....Retires January, 1920

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### SAN FRANCISCO

Frank H. Probert,  
*Chairman.*  
Edwin Letts Oliver,  
*Sec.-Treas.*

### NEW YORK

S. H. Ball,  
*Chairman.*  
J. V. N. Dorr,  
*Vice-Chairman.*  
F. F. Sharpless,  
*Sec.-Treas.*

### PHILADELPHIA

R. H. Sanders,  
*Chairman.*

DOUGLAS, ARMITAGE & McCANN, New York, Counsel for the Society.

# Mining and Metallurgical Society of America

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Vol. XII, No. 7      July and August, 1919

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Bul. 134

## ANNOUNCEMENTS.

**Amendments to the By-Laws.**—The tellers appointed by the President of the Society to examine the ballots respecting the alterations in the By-Laws as published in the January BULLETIN have reported that as a result of their examination they find 123 legal ballots were cast and that the vote in favor of the amendments was practically unanimous.

**National Chamber of Commerce.**—Through invitation the Mining and Metallurgical Society has accepted membership in the Chamber of Commerce of the United States of America. It was thought by the Secretary of the Chamber that its organization would benefit by the appointment of one of our members to its Council and that the Society would benefit correspondingly by this affiliation. At an early date the President will appoint two members of the Mining and Metallurgical Society as delegates to the Chamber of Commerce, one of whom will become a Councillor of that organization.

One of the chief activities of the Chamber at the present time is that of collecting the best views upon the solution of the railway problem and bringing them before Congress.

The Mining and Metallurgical Society has, of course, not yet been able to avail itself of the opportunity offered by its membership in this organization, and at first thought some of its members might question the interest of miners and metallurgists in the railway or similar questions.

Referring to a report of the Bureau of Railway News and Statistics issued just before the beginning of the war, when conditions were normal, it will be noted that for the year ending June 30, 1914, of every dollar received by the railways of the United States 35.94 cents were derived from the movement of "products of mines." This does not include finished manufactures. Mines and metallurgical interests paid over one-third of the entire railway receipts, they paid more than the entire passenger receipts.

While we may have no constructive policy to offer Congress, it may be seen from the above quotation that the welfare of the mining industry will be materially affected by whatever action Congress may take.

Membership of the Society in the National Chamber furnishes a channel for our members to take an active part in the deliberations of that influential organization and a channel through which any suggestions may be presented in a form and on an occasion when they will have the greatest effect.

Another matter in which the National Chamber of Commerce is now active is that of a National Highway System. This is also a subject in which every miner and every engineer is interested. A number of bills are now before Congress bearing on the subject and the Chamber's committee is taking an active interest in advocating the best that is in these bills.

Through the affiliation just made the Mining and Metallurgical Society has had an opportunity of drawing to the attention of the committee the effect of good roads, poor roads and of no roads at all upon the mining industry of the United States. Your Society has further suggested to the committee of the Chamber of Commerce that it advocate the appointment of one or more engineers upon any commission formed for the construction of a National Highway System. None of the several bills that have been drawn provides for this.

Members of the Society are urged to communicate to the Secretary any views that they may have on the foregoing or upon any other national question so that they may be acted upon or transmitted to such bodies as can make proper use of them.

**Reemployment of Returned Soldiers.**—We are advised by Col. Arthur Woods, Assistant to the Secretary of War, that the matter of securing employment for returned soldiers is as pressing as at any time since demobilization commenced.

Those who are in a position to offer employment in any branch of business are requested to communicate with the Engineering Societies Employment Bureau, 29 West 39th Street, New York City.

**Citations.**—The War Department has requested the Mining and Metallurgical Society of America to draw to the attention of its members the fact that citations will be issued by the War and Navy Departments to those employers who promised to and are now re-employing their old service men who left them to take part in the war.



Employers who are entitled to this citation are requested to make application for it through Arthur Woods, Assistant to the Secretary of War, Washington, D. C.

**Bound Volumes.**—The bound volumes of the *BULLETIN* for the year 1918 (Vol. XI) have been distributed to those who have placed orders for them with the Secretary. Members who have paid for this volume but have not yet received it will please notify the Secretary of that fact.

A few extra copies have been bound, which will be sent to members upon receipt of the cost of binding, \$2.00 per volume.

A few bound volumes for the years 1916 and 1917 (Vols. IX and X) are still in the Secretary's hands and may be procured by members at \$2.00 per volume.

## RESOLUTIONS BY THE SOCIETY.

On July 23 the tellers appointed to canvas the vote of members upon the resolutions respecting the death of Mr. E. L. Dufoureaux reported to the President of the Society that 148 ballots had been received and examined. Of these, 144 voted in favor of the resolutions, making the vote practically unanimous.

Upon instructions from the President of the Society personal letters containing copies of these resolutions were sent to the Secretary of State, to all members of the Foreign Relations Committee of the Senate, the Foreign Affairs Committee of the House and the Rules Committee of the House. The latter was holding hearings in relation to Mexican affairs at the time.

Numerous replies have been received from members of the House and Senate, and it is believed that the action of the Society has been of value in further impressing upon our representatives at Washington the serious condition of affairs in Mexico.

One of our members engaged in mining in Mexico writes as follows to the Secretary:

The resolution on which vote is to be taken by the Society as regards Mexico seems to me to be to the point. During the past six years both as an official of a company and in a private way I have gone through nearly all the thinkable conditions attendant on bandit or rebel activity excepting that of being wounded or killed, and the escapes from the latter have been closer than was to be desired.

It is to be hoped that some way out of the difficulty can be arranged without it becoming necessary to go to the extreme. I believe a large number of the Mexican people now realize that Americans as a rule have had the welfare of the Mexicans at heart, and in their capacity as employers have treated them fairly.

## OTHER SOCIETIES.

### ENGINEERING COUNCIL.

**Department of Public Works.**—The National Service Committee is continuing its campaign toward the end that the Interior Department shall become the active center of all Government engineering projects.

A late bulletin of the Committee draws particular attention to the formation of a Federal Highways Commission which is now under consideration by Congress.

It is pointed out that the object of the bill is to appropriate funds for the purpose of assisting such states as choose to take advantage of the funds in constructing or improving post roads. The Department of Agriculture is called upon to administer the funds.

An interesting feature is that this bill, creating a strictly engineering bureau, makes no provision for the commission to have upon it a single engineer. Excluding the commissioners the entire staff and personnel are engineers, its problems are engineering, its interests are engineering interests. It needs an engineer at its head, and it belongs to the Department of Federal Public Works.

The work being done by the National Service Committee is truly National but of benefit to the engineering fraternity as well as public benefit. We take pleasure in reproducing a copy of a letter received from the chairman of the Committee under date of August 2:

My dear Mr. Huntoon.

The delegate from your Society joined with all other delegates at the Chicago Conference, called by Engineering Council on April 23-25, 1919, in setting up a Federation whose specific purpose is to carry on a campaign for the establishment of a National Department of Public Works. We now present a progress report, outline future policy, and ask for a vote of confidence.

The delegates at the Chicago Conference, after creating this federation, demanded that we "go to it". That instruction has been taken literally. The Executive Committee has appointed executive officers and created a Finance Committee. The Committee on Text of Bill has completed its labors and the "Jones-Reavis Bill" (S. 2232 H. R. 6649) to create a National Department of Public Works was introduced into both Houses of Congress on June 25, 1919. While this was going on we proceeded to organize state and local campaign committees throughout the country. Now that we have something tangible in the shape of an official bill on which to focus our efforts, the state campaign committees are rapidly getting down to the real work of securing support for the measure, a necessary preliminary to enlisting the interest and support of their Senators and Representatives in Congress.

The campaign is well under way in many of the states. Engineers, architects, constructors and their technical brethren are manifesting a commendable public spirit. All of this interest and effort must now be co-ordinated and directed if success is to be achieved. Your organization has an important part to play in this. The bill will be called up for hearing early in December and every member of Congress must have heard from his constituents before that time. And that is the work of the local committees.

So far we have been living on borrowed capital. Funds for preliminary work are being loaned by Engineering Council with the confident expectation that a federation like ours, which represents the dignity of the allied engineering profession and industries, will not consent to be otherwise than self-supporting. We need a minimum of \$100,000 to put this project over and much more can be used to advantage. Such an amount, if divided among all the engineers, architects and constructors of the country, will represent a very small individual contribution. Every member of your organization should be urged to "come in", each according to his means. The man who earns \$2,000 a year should contribute a dollar and the man who earns \$10,000 a year should contribute \$25.00.

Each society represented at Chicago is vitally interested. Your representative wanted work done and it is being done, but work costs money and there is a general feeling among those who are familiar with the work that the technical men of the country will certainly be willing to provide it.

This is the first great national project to support which the engineers, architects and constructors of the country have organized. Our job is both definite and difficult. We shall fail unless you back us up and it goes without saying that these professions cannot afford to fail.

Send your contributions to the secretary of your organization, who will acknowledge their receipt and will send them to the Treasurer of the Conference, Mr. Milton E. Ailes, Vice-President, Riggs National Bank, Washington, D. C.

The need of these funds is urgent. The campaign of education is seriously retarded by their lack. If you approve of the results so far obtained and of the plans outlined for the future, support your executives. A full war chest will be the most effective vote of confidence.

M. O. LEIGHTON,  
*Chairman, Executive Committee.*

## COUNCIL.

*Meeting of June 5, 1919.*

A meeting of the Council of the M. and M. S. A. was held at the call of the President on June 5 at the Columbia University Club. The meeting was called to order by the President Mr. Knox at 4:30 p. m.; other Councillors attending were Messrs. Ingalls, Lindgren, Dorr, Sharpless, Catlin, Huntoon and Yeatman.

The President reported that he had invited the following members to serve as chairmen on their respective committees: Chas. A. Mitke, Chairman of the Committee on Vocational Edu-



cation; R. Gilman Brown, Chairman of the Committee on Post-Graduate Education.

The President was authorized to discontinue any inactive committees.

The Secretary reported a substantial increase in membership during the present year.

The Secretary was requested to call to the attention of the members the publications of the Union League Club on Bolshevism. Through the courtesy of Mr. C. R. Corning copies of two of these publications were presented to the Society and have been mailed to all members.

**Industrial Conference Board.**—Under date of May 1, Mr. C. R. Corning addressed a letter to the Council suggesting the advisability of the Society joining this organization.

The National Conference Board was organized in response to the demand for cooperation among manufacturers. Its object is to unify and centralize the efforts of industrial associations in studying and solving the economic problems of industry and to take constructive action in respect to issues vital to the welfare of all.

Mr. Corning was asked to investigate the matter and report to the Council under what conditions the Society could become an active member of the organization.

**National Chamber of Commerce.**—Mr. Ingalls reported that an invitation had been received inviting the Society to become a member of the United States Chamber of Commerce. It was moved and carried to accept this invitation.

**Bureau of Mines.**—The President was authorized to appoint delegates to attend the dedication of the building of the Bureau of Mines at Pittsburgh on September 29, 30 and October 1.

**Gold Medal.**—Mr. E. Gybbon Spilsbury was appointed Chairman of the Presentation Committee which will make arrangements for the presentation of the annual medal to Mr. Charles Eugène Schneider sometime during the fall of 1919.

LOUIS D. HUNTOON,  
*Secretary.*

## EXECUTIVE COMMITTEE.

**Meeting of July 14, 1919.**

A meeting of the Executive Committee was called by the order of the President for July 14. The President, Mr. Knox, Mr. Ingalls and Mr. Sharpless attended.

The resignation of Mr. Huntoon as Secretary-Treasurer was presented and read. Owing to professional engagements calling Mr. Huntoon away from New York during the greater part of the remainder of the year he asked that he be relieved of this work.

It was moved and carried that Mr. Huntoon's resignation be laid upon the table until it could be acted upon by the Council, and that Mr. F. F. Sharpless be appointed Acting Secretary-Treasurer ad interim.

Mr. Lucius W. Mayer and Mr. J. A. Church, Jr., were appointed tellers to canvass the votes upon the resolutions respecting the death of E. L. Dufourey and alterations in the By-Laws.

The Secretary-Treasurer was instructed to prepare a budget for the year 1920.

Adjourned.

F. F. SHARPLESS,  
*Acting Secretary.*

## MEMBERS ELECTED IN JULY.

|                        |                                                                                 |
|------------------------|---------------------------------------------------------------------------------|
| Allen, A. W. ....      | Casilla L., Antofagasta, Chile<br>Mining Engineer.                              |
| Mather, T. W. ....     | Oroya, Peru, South America<br>Asst. Gen. Mgr., Cerro de Pasco Copper Corp.      |
| Meissner, Carl A. .... | 71 Broadway, New York<br>Associate to Assistant to President, U. S. Steel Corp. |
| Mitke, Chas. A. ....   | Bisbee, Arizona<br>Consulting Mining Engineer.                                  |

## CHANGES OF ADDRESS.

|                         |                                       |
|-------------------------|---------------------------------------|
| Cates, Louis S. ....    | Utah Copper Co., Salt Lake City, Utah |
| Liddell, Donald M. .... | Room 1800, 66 Broadway, New York      |
| McClelland, J. F. ....  | 120 Broadway, New York                |
| Sharpless, F. F. ....   | 115 Broadway, New York                |
| Weld, C. M. ....        | 66 Broadway, New York                 |

## PERSONALS.

A. W. Allen has left for Antofagasta, Chile.

Louis S. Cates, General Manager of the Ray Consolidated Copper Co., has accepted appointment as assistant general manager of the Utah Copper Co., with offices at Salt Lake City, Utah.

Welton J. Crook has gone to British Columbia on mine examination work.

Francis Drake sends word that he is no longer acting as consulting mining engineer for Messrs. Lewis & Marks as published in the current member list.

Louis D. Huntoon left for the West on July 19 on professional work.

J. P. Hutchins has been in Constantinople since May 22. He has been twice at Baku and has made one trip along the Anatolian Coast. Mr. Hutchins reports conditions in this country still very much disturbed and the outlook for early resumption of business as decidedly discouraging.

Donald M. Liddell has again taken up his work of chemical engineering with headquarters at 66 Broadway, New York, and laboratory at 961 Frelinghuysen Avenue, Newark, N. J.

Henry M. Payne was in Idaho and Washington on professional work during the month of July.

R. T. White writes to the Secretary under date of May 23 that his position is that of general manager of the American Smelting & Refining Co. in South America. This corrects the information conveyed by the member list recently published.



# STANDING COMMITTEES

## Executive Committee

H. H. KNOX  
 LOUIS D. HUNTOON  
 W. R. INGALLS  
 R. A. F. PENROSE, JR.  
 F. F. SHARPLESS

## Presentation of Medal

E. GYBBO SPILSBURY, *Chairman*  
 GEO. C. STONE  
 C. R. CORNING

## Vocational Training

CHARLES A. MITKE, *Chairman*  
 STANLY A. EASTON  
 BENJAMIN F. TILLSON

## Mine Taxation

J. R. FINLAY, *Chairman*  
 E. T. CONNER  
 HERBERT C. HOOVER

## Standardization

C. R. CORNING, *Chairman*  
 J. PARKE CHANNING  
 GEO. C. STONE

## PAST PRESIDENTS

|                                 |                        |
|---------------------------------|------------------------|
| HENRY S. MUNROE.....1908-1909   | JAMES F. KEMP.....1914 |
| J. PARKE CHANNING.....1910-1912 | W. R. INGALLS.....1915 |
| HENRY M. CHANCE.....1913        | J. R. FINLAY.....1916  |
| W. R. INGALLS.....1917-1918     |                        |

## FORMER SECRETARIES

|                            |                             |
|----------------------------|-----------------------------|
| J. R. FINLAY.....1908-1909 | W. R. INGALLS.....1911-1914 |
| HENRY S. MUNROE.....1910   | F. F. SHARPLESS.....1915    |
| LOUIS D. HUNTOON.....1916— |                             |

## GOLD MEDAL

|      |                                 |      |                 |
|------|---------------------------------|------|-----------------|
| 1914 | HERBERT C. HOOVER               | 1916 | JAMES F. KEMP   |
|      | LOU HENRY HOOVER                | 1917 | E. P. MATHEWSON |
| 1915 | ROBERT H. RICHARDS              | 1918 | POPE YEATMAN    |
|      | 1919 (CHARLES) EUGENE SCHNEIDER |      |                 |



# Mining and Metallurgical Society *of America*



Bulletin Number One Hundred Thirty-five  
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*Secretary-Treasurer*, F. F. SHARPLESS, 115 Broadway, New York.

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### NEW YORK

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*Chairman.*  
G. D. Van Arsdale,  
*Vice-Chairman.*  
A. P. Watt,  
*Secretary.*  
S. H. Ball,  
C. M. Weld.

### PHILADELPHIA

R. H. Sanders,  
*Chairman.*

DOUGLAS, ARMITAGE & McCANN, New York, Counsel for the Society.

# Mining and Metallurgical Society of America

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Vol. XII, No. 8 September and October, 1919

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Bul. 135

## ANNOUNCEMENTS.

**New York Section.**—A meeting of the New York Section of the Society was held at the Columbia University Club on September 23. The subject of the evening was Vocational Training. In the absence of the chairman of the New York Section, W. R. Ingalls occupied the chair and opened the discussion.

**Council.**—A meeting of the Council was called by the President for September 23 at the Columbia University Club, New York City. A quorum failed to attend and the President convened a meeting of the Executive Committee. A report of this meeting is given elsewhere in this issue.

**Spanish Influenza.**—At a meeting of the New York Section, held at the Columbia University Club, on December 16 last, there was a discussion respecting methods for the control of influenza in mining camps. There is considerable fear that there will be a return of the epidemic during the coming winter and we are requested to ask those who have used calceose, the remedy suggested at the meeting referred to, or other preventatives, if they will not submit the results of their attempts to control the disease where favorable results have followed.

## COMMUNICATIONS.

**Foreign Mining Resources.**—The subject of foreign mining resources has been frequently discussed of late in the office of the Secretary of the Society, both by members and by those who have sought for information through the office. On more than one occasion it has been proposed to devote one or more evenings of the meetings of the New York Section to some phases of the subject, and at an early date this will be done.

In order to start a discussion of the subject and place before the members some of the plans of the United States Government,

the Secretary wrote a personal letter on August 25 to Dr. George Otis Smith, Director of the U. S. Geological Survey, asking various questions. The reply to this letter is so intensely interesting that the executive committee of the Council has advised the publication in the Bulletin of both the letter addressed to Dr. Smith and his reply. It is hoped that these letters will bring out further discussion in the Bulletin or at meetings of Sections that may be of advantage to members and to the public. The Secretary's letter follows:

DR. GEORGE OTIS SMITH,  
Director U. S. Geological Survey,  
Washington, D. C.

My dear Dr. Smith:

I have been revolving in my mind a subject that is of considerable interest to me, and I believe to others, without getting very far with it. Perhaps others have been thinking of the same subject and have gone further with it than I. If so, you undoubtedly are aware of that fact, hence I am taking the liberty of writing you for enlightenment. The subject that I have in mind is that of foreign mineral resources.

First.—Is it advisable to encourage our mining people to develop foreign mineral resources? What is to be gained by expansion in this direction?

I am one of those who believe most thoroughly in the idea that industry follows the prospector and the flag follows industry. If we can develop more foreign mines, it means the expansion of foreign trade, it means more intimate business relations with the countries where those mines are developed.

Some of us have an idea that the United States has become the center where foreigners should look for funds for the development of their mines rather than to France or England as was formerly the case. If this is true, our men of affairs must be educated to the belief that foreign mining investments are not types of vicious gambling, and that opportunities for good mining business exist abroad.

One thing is certain, we are a nation possessed of enormous credit at the present time. Legitimate foreign investments will tend to reduce this unhealthy credit. A few mining investments will reduce this to a very small extent, to be sure, yet every investment abroad will be some help in this direction.

Second.—If the foregoing is correct what can be done to encourage such foreign investments? Can engineers acting collectively do anything worth while? Can Government bureaus do anything? Or, is it their proper function to go outside of national boundaries?

Offhand, I would be inclined to say that patriotism and good busi-



ness would demand that engineers devote any surplus energy to the development of domestic resources. But, on further thought, it strikes me that domestic developments are in a position to care for themselves, that they will do this normally without any concerted effort from engineers or Government bureaus. Both societies and bureaus are going to continue to function in their normal manner producing their normal effect upon domestic industry. I believe that both agencies can and should, under the circumstances, look beyond the borders of their country.

It is unfortunately true that many engineers feel that their knowledge of certain foreign fields is a part of their stock in trade, and that in the making of such knowledge public they are taking bread from the mouths of their children; and yet I feel sure that, if much of this personal knowledge were made public, the demand for engineering service would grow materially and there would be no question about bread for the children. There are, however, many engineers of broader mind who would work together, if they could be intelligently led in a direction that would possibly produce results.

I believe that your Department found it advisable to procure, or to endeavor to procure, from all available sources information in respect to foreign mineral supplies. Whether you really got anything that was worth while I do not know. You promised that you would regard contributed information as confidential when so requested. I imagine that your efforts were quite worth while and that you have in your files a tremendous amount of information which would be extremely useful to Tom, Dick or Harry if you could give them access to it. If this is the case, then it seems to me that there ought to be some Government agency to gather these and similar facts at first hand so that they could become public property—so that this type of information could be and would be disseminated to national advantage.

We have our commercial attaches who occasionally send in some reports bearing on the mineral resources of the country to which they are attached. Some data come to us through consular reports, but from both of these sources the data are meagre and often valueless, since they are collected by men having no technical knowledge of the subject upon which they are reporting.

Would it not be good business for the United States to send abroad attaches or representatives capable of investigating the mineral resources of the countries to which they are sent? Would the fields be too broad? Would there be a tendency to spread out so that real usefulness would become very much attenuated? Or, could properly selected men gather and send home matter of real value?

Several specific instances have come to my attention within a short time where, if the Government had possessed the knowledge or had had

an agent on the ground who could have secured it at reasonable expense, there might have resulted foreign business that would have been of material advantage to domestic industries. As an illustration of what I have in mind I might refer to a case in which, for certain purposes, we needed a high-iron low-silica bauxite. So far as we could learn through foreign and American publications, France and Austria alone had such bauxite. It could not be brought out of those countries because of war conditions. We learned of various points where bauxite was known to exist abroad but, because iron is generally regarded as an impurity, we could not learn whether iron bauxites were available or not. No analyses showing much iron were given. Naturally such ores would not be developed. The expense of sending engineers to these various localities was not warranted by the extent of the business so the matter was dropped until the war was over.

Another case. Recently the matter of Madagascar and Ceylon graphite resources came up. The information sought has not been found in any public report and the expense of sending engineers to the field in question is not warranted by the nature of the business in hand.

We are to-day considering the question of an American mandate over Turkey, Asia Minor and the Caucasus, countries rich in mineral resources, but unknown except to a very few American mining men. If the possibilities of these countries were known to Americans, I venture to say we would at least have some opinion as to the propriety of becoming more intimately associated with them.

At one of the early meetings of the New York Section of the Mining and Metallurgical Society it is proposed to discuss such matters as I have suggested in the foregoing. If you can give me any light on the subject, anything that will help the society to do useful work and prevent it from doing useless work and help it to avoid useless discussions, it will be deeply appreciated.

Yours very truly,

F. F. SHARPLESS.

Dr. Smith's reply is dated September 9, and reads as follows:  
My dear Mr. Sharpless:

I was especially interested in your letter of August 25, but was forced to delay my reply until my return from a trip to Alabama.

The first question that you raise is regarding the advisability of encouraging the development of foreign mineral resources by our own mining men. To this question I give a decided affirmative. During the war period we exerted every effort to make America industrially independent, a phrase that you may remember I made the sub-title of a brief summary published by the Survey as Bulletin 599, in September, 1914. With all of the success attained, and I think the development

of our mineral resources to meet the war demands was beyond anything that we could have expected, yet some of us learned that there is an economic limit to the utilization of high-cost domestic supplies in preference to relatively low-cost foreign supplies. As I have tried to point out in the preliminary chapter of the 1917 Mineral Resources, Part 1, a copy of which I enclose, the problem is not the simple one of dollars and cents but involves considerations of national strategy in the handling of raw materials.

It becomes almost self-evident that for some minerals, even though America is of all nations the most favored by nature, we must turn to foreign deposits, and this is the reason for my affirmative answer to your first question. I note, however, that you ask regarding the gains to be expected by expansion in this direction. I am in full agreement with you in your statement that through the intermediate step of industrial development the flag surely follows the explorer, and by this neither you nor I have any ambitious ideas of exploitation of foreign countries in the old time sense. It happens that I have already expressed myself on this subject before the House Committee on Ways and Means at its hearing on the subject of tungsten ores, on June 13 last, when, in response to the questions by the different members of the Committee, I made the following statement:

" . . . . There was just one other general point I would want to suggest that it seems to me ought to be considered in the case of several of these mineral commodities and that is the relation of American-owned mines in foreign countries. Now, in the case of tungsten, as I understand, there is some American capital invested in Siam, Hong Kong, Korea, Portugal, Argentina, and Bolivia, so that I believe, fortunately, we have some American interests outside the doors of the United States. I say fortunately because—this is not the subject under discussion, but it seems that it has the direct relation to the question—it affects our shipping program and our general commercial program; and every time there is a mine under American auspices, whether in Burmah or in South America, I think there is to that extent a market for not only American property but for commodities manufactured here in the United States.

"Mr. Garner.—American shipping will have the advantage ordinarily of transporting production?

"Mr. Smith.—Both ways.

"The Chairman.—But in that case American capital employs foreign labor.

"Mr. Smith.—They employ foreign labor in part, but they also employ American engineers, and too many of our American engineers. I think, have been employed by British capital rather than by American capital; but that may not bear directly on this question except as it does



have an influence, and there have been some very strong statements made to me regarding American capital invested in South America, where we need an exchange of products. . . . ."

I think the above quotation will show you that I have been thinking along much the same lines as yourself.

In reply to the two parts of your second question I can also give affirmative answers. The engineers can help by pooling their information for the common good, and the Government bureau can help by acting as a central agency for this pooling of information. I believe you are more or less in touch with what the Geological Survey has undertaken in this line, and my statement of policy is given in the paper on the "Economic Limits to Domestic Independence in Minerals," to which I have already referred. On page 3 of that paper I suggest the term "commercial geology," that is, applied in terms of commerce as a necessary application of our science at this time when we have come to learn that it is not sufficient to know simply what America possesses.

I am convinced that the questions of the development of domestic resources and the exploitation and development of foreign resources must be considered together, and my discussion on the subject with engineers from whom we have sought information regarding foreign fields has made me thoroughly optimistic on the question of their co-operation. I feel that already we are securing results, and you may be interested in a simple outline of the status of the work of our Section of Foreign Mineral Deposits. This Section is now a definite part of the Survey's Division of Mineral Resources and, in the preparation of data for the Peace Conference, the several Survey geologists devoted the major portion of their time to this new work. Among them I may mention Messrs. J. B. Umpleby, Adolph Knopf, Arthur C. Spencer, H. G. Ferguson, Max Roessler, and Eugene Stedinger, and Miss Eleanora F. Bliss. The co-operation with the mining men that was asked in a circular letter, which informed them of these open files of information, has been given generously, and the pooling of information from these many sources will surely prove of large benefit to American commercial interests, and this was the purpose of myself and associates in undertaking this work.

I am informed that the number of users of these open files varies from several a day to only a few in a week. Many of the manuscripts and cards, and also the maps, have been copied in complete form by representatives of mining corporations, by mining engineers and consulting geologists outside of the Government service, by professors of geology in several of the leading universities, by members of some of the foreign geological surveys, and by geologists of this Survey and representatives of other Government departments.

The men who have used these files have been unanimous in the

opinion that this section covers a long felt need in the realm of geology and mining engineering; that the material is presented in a very clear and concise manner and that the files are on the whole very satisfactory.

It has been suggested that this new phase of the Survey's work receive more publicity than it has had heretofore, for a number of mining companies and consulting geologists are still unaware that this fund of material is open for the use of the public. To this end, I will appreciate any help that you may find it possible to give and I do not hesitate to ask this co-operation, knowing how thoroughly in sympathy you are with this expansion. You will see that there is a slight misunderstanding on your part in believing that the information that we have secured is for official use only. There is a distinction made at the option of the giver of the information between what can be inserted in our open files and what must be kept for the use of the Government geologists only. A distinctive card is used for the confidential data and I have been told that from some of the largest contributors of information not more than 10 per cent was given with any restriction regarding publicity. So you will see that the co-operation on the part of both corporations and engineers is more complete than you thought possible and, indeed, than I believed would have been possible before the war.

Of course, much of the material obtained in this campaign for unpublished data regarding foreign mineral deposits will be utilized in Survey publications. In fact, two manuscripts on the iron resources of Europe are already in the editor's hands, preparatory to publication as bulletins, and atlases showing the mineral reserves of Europe and Latin America have been completed, while the first part of the "World Atlas of Commercial Geology," which will set forth the facts of the distribution of mineral production, is already in press.

In reviewing what has been accomplished by the Geological Survey in the last year or two, I must give a large share of credit to Amor F. Keene, who volunteered for service with the Geological Survey and while in the Government employ was the chief adviser of Mr. Umpleby and myself in planning the collection of data concerning foreign mining fields and its best use when collected. Mr. Keene's wide experience contributed the vision needed to handle properly these world problems of mineral raw material.

You may consider this letter as an informal report of progress to the Mining and Metallurgical Society of America as well as a request for continued co-operation.

Cordially yours,

GEORGE OTIS SMITH,  
*Director.*

## MEETINGS OF SECTIONS.

### NEW YORK SECTION.

Meeting of September 23, 1919.

The New York Section of the Society met on Tuesday evening, September 23, in the Columbia University Club. In the absence of Sidney H. Ball, W. R. Ingalls presided. Members attending were as follows: H. H. Knox, A. F. Keene, C. S. Wetherell, John Langton, C. A. Rose, Wilber Judson, F. W. O'Neill, W. H. Aldridge, H. M. Chance, A. E. Drucker, Robert Peele, J. P. Channing, W. Volney Lewis, H. W. Hardinge, R. M. Raymond, Robert Linton, and F. F. Sharpless. Guests attending were: L. W. Mayreis, Burr Wheeler, L. W. Kemp, T. M. Chance and H. L. Carr.

**Mr. Ingalls.**—This is the first meeting of the New York Section of the Society this year. Mr. Ball, the Chairman of the Section, was unexpectedly called out of town after having made the arrangements for this meeting. As he is unable to be here himself, he has asked me to take the chair; so I have been plunged into this thing and I am unable to offer you much in the way of introduction to the speakers.

Mr. Ball arranged that the subject of discussion this evening would be "Occupational Training." That is one of those things that at the present time we are bound to characterize as being a major subject. There are many major subjects and I find it difficult to say that one is of more importance than another, but certainly everyone who has reflected upon this will agree that occupational training is an important subject.

The great need of the world at the present time, even the great need of this country, is for more production. Unless there is more production and less extravagance in consumption, economic conditions will not begin to improve. I have lately been making an economic study of the wealth and income of the United States and, in connection with this, one thing has stood out very clearly, namely, that among the major classes of workers in this country, the metal miner is one of the best paid. I am bound to refer to figures of three years ago, because figures for the last year do not exist. However, if they did exist they would not alter the lesson, for although the workers in 1918 got more money in wages than they did in 1916, they did not get any more in goods.

Speaking, therefore, of the year 1916, whereas the agricultural laborer in that year received on an average about \$400.



and about seven million of them got that; and whereas seven million factory workers received an average of \$675, and the two million men engaged in operating the railroads of the country received an average of about \$900, the metal miners of the country probably received an average of \$1,250. That figure is not precise but I am inclined to think that it is rather below the truth than it is above it.

Now, when you think of those figures and also think that the great metal mining industry of the country is conducted by about 150,000 men only and that those 150,000 men produce about 150,000,000 tons of ore, you must draw the conclusion that those figures reflect an organization that is far superior to what exists in almost any other major industry. If it were possible to mechanize the farms in the same way as has been the mine or if farming could be conducted by great corporations able to employ superior talent, if those things were possible, the farms of the country could no doubt be operated by much fewer men and those fewer men would receive a much greater annual wage.

Now, although we of the mining industry have got a great deal whereof to be proud, considering such revelations, nevertheless the economic situation in this country as well as in those parts of the world that are not so well off, is such that no effort must be spared to effect increased production. We must strive for that through improved organization, through greater inspiration among the high commands, we must strive for it among the generals of brigades and the colonels of industrial regiments, but we must not shut our eyes to the need for improving the non-commissioned officers of our industry and the privates. It is largely through them, through their improvements that we are going to attain the increased production that we have got to have.

I am not well informed as to the lines of thought along which Professor Peele is going to talk to you to-night, but without even discussing the question with him I have somehow gathered an opinion that he will probably talk to you upon just those lines, namely, the improvement of the N. C. O.'s, and the privates of our industry. I have told you that it must be done and I think he will outline to you some means by which it may be done. Gentlemen, I have the pleasure of introducing to you Professor Peele.

**Professor Peele.**—I have been asked to discuss the possibility, or advisability, of undertaking vocational training of miners in the mining schools. It has been attempted in a few

instances, as at the School of Mines of the University of Arizona, and, I think, in the school at Rolla, Mo., but I am not sure that either institution has attained success.

It is clear that there is a wide difference between the kinds of instruction and equipment suitable for the training of mining engineers and of miners, and wide differences also in the human material to be worked up. The applicant for admission to a school of mines must possess a knowledge of elementary mathematics, physics, chemistry, free-hand and mechanical draughting, and, perhaps, some mineralogy, together with a reasonable degree of facility in the use of good English. In this gathering of engineers, it is unnecessary to state in more detail the scope of the preliminary education demanded for admission to the schools.

Vocational training, on the contrary, is designed for those who have not had the advantages of much schooling; often of not even a common school education. In some parts of the country, particularly in the coal regions, many of the miners are of a lower grade of intelligence, and have even less education than those of the metalliferous regions of the West and Northwest. Many coal mining towns and villages contain large numbers of men who know little or no English, and not very much of their mother tongue. For these, there is a greater necessity for vocational training, combined with which should be an obligatory course in elementary English.

Restricting the discussion within the bounds specified by the Chairman, the usual idea of the scope of vocational training is a training consisting mainly of instruction in the best method of doing work, leading to greater efficiency of performance and advantage to the miners themselves, as well as to their employers. It is, in effect, a modified form of what in recent years has been called "efficiency engineering." In planning such instruction, it must be borne in mind that the potential pupils have not been subjected to the sorting process of preliminary education, that operates in so marked a degree upon the mental qualities of the young man admitted to mining schools. The average miner comes nearer to being raw material and must be handled accordingly.

In this kind of vocational training for miners, instruction is limited to the most efficient methods of performing the every day operations of actual mining. Among the subjects the following may be mentioned: The location and pointing of drill holes and the determination of their proper depth, together with the details of charging, tamping and firing. Men ranking as skilled miners are sometimes woefully deficient in sound knowl-

edge of this work; and their foreman and shift bosses may be little better, neglecting to correct poor practice, even if they know it to be poor. The holes may not be pointed properly and drilled to such depths as to take advantage of the shape of the face and the presence or absence of bedding planes, fissures and slips, that influence the results of blasting. The amount of charge may be wrong, the cartridges may not be well compacted in the hole, the primer may be wrongly placed with respect to the other cartridges, the cap may not be correctly inserted in the primer, and the hole may be untamped or tamped insufficiently. Many miners maintain that for dynamite tamping is more or less superfluous. A few tests in a given rock or ore will show the advantages of attention to these details, in saving drilling time and explosive. Overcharging is a common fault. The drilling and firing of a single hole is a small matter, and a possible percentage saving on it may be negligible; but in large mines, where many hundreds of holes are fired per day, the aggregate possible saving is well worth while. A competent superintendent should see that his foremen and shift bosses insist upon proper blasting practice in their overseeing of heading, of sinking and stope work. The need for such control is illustrated by the employment of especially trained "shot-firers" in many bituminous mines, though here enter other questions, also, respecting the dangers of gas and dust.

Another field of instruction comprises the handling and running of machine drills. Much can be done to lengthen their life, and to save drilling time and money by reducing the frequency of their visits to the repair shop. Abuse of drills is much too common, through the miner's ignorance, or lack of control of his temper when a bit persists in "fitchering," owing largely, perhaps, to his own careless setting up of the column or tripod.

Miners, as well as trammers, should be encouraged to watch the condition of the tracks and report needed repairs to the foremen or trackmen. The labor of tramming is thus reduced, derailling of cars minimized, and loss of time of other cars besides that of the one derailed is prevented. Trammers should be taught to treat their cars with intelligent consideration, seeing that they are well lubricated and refraining from abusing them. All employees should be expected to watch for leaks in air or steam lines underground and report them promptly.

There may be serious loss through mismanagement of timber gangs. The boss timberman may fail to co-ordinate his men's work in different parts of the mine, so as to economize time in travelling back and forth in long drifts or haulageways.



Saving of considerable time is also possible by checking misuse and waste of timber.

The care of all the tools used by company men (in contradistinction to contractors who supply their own tools) affords another opportunity for economy.

This incomplete summary points out some of the possible modes of improving the conduct of underground work. Many of the matters noted are small when considered as units, but become important in the aggregate in large mines, which afford the best field for the introduction of vocational training.

A second, and very different kind of vocational training might be advantageous for some miners. I refer, in brief, to instruction in the rudiments of mathematics, physics, chemistry, mineralogy and ore-deposits, carried on separately or synchronously with instruction in the mining operations already mentioned. Probably this study could be undertaken only by the more intelligent and ambitious men, and those who have had some common school education. It might often result in giving a start in life to men of good but dormant capabilities, who otherwise would always remain ordinary miners.

In discussing vocational training, one of the important questions to be answered is: By what type of teacher can the instruction best be given?

I venture to say that many successful teachers of the subjects comprised in the schedules of study followed in mining schools would be unsuccessful if they were to attempt to carry out a course of vocational training for workers in mines or metallurgical works. There is great diversity in the ends sought and the means to be employed. The attitude of mind that is proper and necessary for the teacher of young engineers is unsuited to the task of imparting instruction to men whose modes of thought are usually unaffected by even an elementary education. And the things required to be taught to the miner are different in kind or scope from those forming the major part of the course of study of an engineer.

Believing this view to be well-founded, it seems to me it would be unwise to attempt to co-ordinate vocational training with the work of the mining schools, at least in the sense of having the two courses of study administered and taught by the same instructors. Moreover, correct methods of doing underground work, as outlined in the first category, can evidently be best taught in the mines themselves, where the actual conditions exist. To try to reproduce these conditions on the surface, or, what would be still more difficult, in the buildings of a

mining school, would involve considerable expenditure and the plant when completed would lack the element of reality. Instruction in such circumstances would be much less effective. In large measure the work would be make-believe, requiring both teacher and pupil to imagine many things which could be only imperfectly represented.

A few of the state mining schools, situated in mining districts, might undertake to give vocational instruction by maintaining special teachers, whose schoolrooms would be underground. But the numerous schools that are not near mines, and the privately endowed institutions, could hardly expect to attract pupil miners from a distance and at some expense, to undertake a course of study, the value of which few would appreciate until the beneficial results were in part realized. Workmen naturally demand immediate results; promises for the future do not satisfy them.

The second kind of training for miners—in the rudiments of mathematics and the natural sciences—could be carried on in some of the mining schools. Most of the work would have to be done in the latter part of the afternoons, when the miners come off shift and in the evenings, and would also require special instructors. I will not here discuss the question as to the probable proportion of miners in any mine or district, ambitious enough to undertake two-shift work.

Instead of attempting to co-ordinate the vocational training of miners with the work done in mining schools, better results might be attained, at least at large mines, by carrying on the instruction under the administration of the manager or superintendent in the company's mine. To do this successfully, a high-grade man would have to be put in charge; a man with experience in mining as well as aptitude for teaching, so that he could command the respect and confidence of the miners. He would have to think their thoughts and talk their language, in the sense of adopting a manner and attitude of mind that is suitable to his pupils, and which is quite different from the normal mental attitude of a professor in a technical school. This kind of instruction would require both tact and hard work. One or more assistant instructors would usually be necessary, according to the size of the mine and number of employees. These assistants might be drawn from among the best and most intelligent of the miners.

It would perhaps be best to begin with the instruction aiming to improve methods, while the miners are engaged in their regular shift work. After the men become interested in the

results of this innovation, a considerable portion of them might be persuaded to enter evening classes in arithmetic, algebra, geometry, physics and mineralogy, leading up to the subject of ore-deposits. A course of lectures on personal hygiene, would also be desirable, intending to increase the men's efficiency. Such a proposal may be objected to on the score of the cost, but a little consideration will show that at a large property, an expenditure of say \$10,000 or \$15,000 a year would soon be returned, and more, in the improved morale of the men and the quality and quantity of their work.

Efficiency engineering, which we must agree is closely related to the idea of vocational training, also costs something to introduce and make effective; but, when tried earnestly and intelligently, is bound to produce beneficial results. In these days of diligent seeking after better work and more economy, a large company might well afford to organize an instruction department, using the mine as a laboratory.

In conclusion, I think well directed vocational training would accomplish more than simply increase the quantity and improve the quality of output, whether expressed in terms of goods or of work. It would tend to instil in the men a salutary feeling of pride in their occupation, combined with the conviction that, in attaining efficiency and doing good work for the employer, the employees are also advancing their own best interests in the broadest sense. A worker, who realizes that he is dealt with as an individual and that he has opportunity for advancement, abandons his own shiftlessness, because he feels the spur of ambition. He is less likely to join in unwise or unwarranted strikes, finds life better worth living, and becomes a better citizen.

It was remarked by one of those who took part in the discussions on the labor question at the last annual meeting of the American Institute of Mining Engineers that "a workman with good health and a contented mind should be an ideal component of a progressive industrial concern." This is unquestionably true. A contented workman is no longer attracted by a nomadic life; he will not be one of the army of employees who are continually moving from place to place. He becomes an element of stability in the working force, that is so desirable in the conduct of all business enterprises.

**Mr. Ingalls.**—Professor Peele has made some very concrete suggestions for the educational improvement of miners. It seems to me that his suggestions may be divided in the first place under two heads, one, education through the medium of mining



schools conducted by the state or some branch of government, and two, education through the medium of mining schools conducted by the industry, in this case the mining company.

I suppose that heretofore the thought and practise on this subject has been rather in the direction of the mining school conducted by a branch of the government. The Germans had for many years such classes in some of their mining districts, and at some places in this country efforts have been made with more or less success, chiefly less, I believe, to conduct similar schools. Recently, however, some of our large companies, appreciating the importance of this kind of education, have instituted within themselves, if not real organized schools, at least means for accomplishing those purposes. The great corporation of Phelps Dodge has been doing a great deal of work in this direction and, from all that I hear, very useful work.

It will be good, therefore, if we now have some remarks on this subject by one who will speak from the position of a large operating company, and as one who can speak authoritatively in that way I have pleasure in introducing to you Mr. Channing.

**Mr. Channing.**—Mr. Chairman and gentlemen, I have been given the credit for having started the movement which resulted in the organization and development of the Michigan College of Mines, which was formerly and much more democratically known as the Houghton School of Mines. This resulted from a letter which I wrote that was published in the *Marquette Mining Journal*, I think in 1885, after I had been Deputy Commissioner of Mineral Statistics in Michigan in 1884 and had visited all of the copper mines. I was impressed on that trip by the number of foremen and miners who spoke to me of the utter lack of any opportunity in the copper country of their getting instruction or of being able to better their knowledge of the principles, or their knowledge of mining, and they bemoaned the fact that there was no place where they might study outside of work hours or in the evening.

A couple of years before that, when Professor Peele and I, who were classmates, had been down at the mines of Eckley B. Coxe at Drifton, Pa., Mr. Coxe had even at that time, thirty-seven years ago, schools where his miners could, if they so desired, go and study the elementary things of which they, perhaps, knew nothing or the more advanced subjects. So that letter that I wrote was really a plea for the miner, a plea for the foreman, a plea for the man who was working with his hands and who wished to increase his brain capacity. The thing was

taken up, strangely enough, in an entirely different manner by Senator Hubbell and resulted in the building of the Houghton School of Mines, although I must say when I wrote this letter I was not looking forward to making more mining engineers, but was trying to advance the knowledge of the man who was actually doing the mining.

Of course, at that time on Lake Superior, a large proportion of the working men spoke English. They were largely Cornish, Irish and Scotch. There were just commencing to come in at that time Swedes, who usually learned English quickly, and who were good capable men. As time has gone on, we have had more and more an influx of the type of foreigner who has not learned English and who very frequently, apparently, does not desire to learn English. The most unfortunate thing in our whole industrial situation today in these United States is the fact that such a large proportion of our men is not instructed in English. Though I am sure it is necessary and desirable to be instructed in mathematics and the simplest forms of physics, the first thing that we must get is English.

I had the pleasure yesterday of taking luncheon with Mr. H. Mensforth, the English manager of the Westinghouse Electric & Manufacturing Company. In addition to this, he is the president of the Manchester District Engineering Trades Employers' Association. He told me that there were two things in England that made negotiations with the men much simpler than in this country and one of them was that 99.44 per cent of his people were Britons and spoke English, and in addition that there was the ingrained idea in the Briton of the recognition of law and order. He mentioned incidentally that if they had a strike, the idea of having armed guards was entirely out of the question. Undoubtedly the great difficulty that we have in this country in properly handling our labor and properly explaining rules to them is their want of knowledge of the English language.

In my own experience, that is in the mines with which I am connected, I am sorry to say that we have not in any case, so far as I know, deliberately started classes for the instruction of the men. In Tennessee, where I started nineteen or twenty years ago, we were fortunate in having 100 per cent of our men speak English and 100 per cent of them American for three generations back. But those conditions did not obtain over four or five years. Eventually we were under the necessity of bringing in foreigners. In Arizona, the condition has been worse in regard to the number of English-speaking men, and since the great war, in fact since the beginning of the first Balkan War,

when our Montenegrins and Serbians left us, we have had to fall back more and more upon Mexicans, so that to-day in the Miami-Inspiration district 50 per cent of our miners are Mexican.

Before we can go into anything in the way of vocational instruction, the main and most important thing is to teach these men English and I think that this is absolutely the most important thing. When a foreigner has mastered English then it is possible for him to understand American traditions and what American ideals are. If he has not learned English he is entirely at sea. He comes over to this country with the idea that someone has told him that this is a free country and he is unable to distinguish between liberty and license. He probably has been brought up in a country where his liberties have been tremendously curtailed, where he has been strictly ruled by class; he has no idea of democracy and it is impossible for him to conceive it and understand it until he does know English. And so I say that the most important thing in this country is the imparting of the knowledge of the English language to the foreigner. Until you do teach him English you cannot by any possibility make a good citizen out of him. We have indirectly, however, at Miami and in Tennessee, been giving men instruction in English and also in some of the other branches. I say indirectly because it is done through the Y. M. C. A. All of the industrial Y. M. C. A.'s now have classes in English, classes in the study of the Constitution, and then classes in mathematics and in the simpler branches. So that indirectly we are doing some work of that kind, but it is by no means as much as it should be.

But strict vocational training, or rather, I should say, the training of the men in their own work, that, of course, I will admit is rather haphazardly left to the foremen. Still, for the last five years we have been in such a position that we have simply had to take the men that have come along. We have not been able to pick and choose; we have been under the necessity of taking men who were incompetent and trying to make miners, timbermen and shovellers out of them. As you well know, a man has even to be instructed in how to handle a shovel. It is just as important to teach him to shovel properly as it is to teach him to handle a one-man air-drill, to point his holes and charge them properly. As I say, this has been left and is being left to the foremen. Then we are up against the difficulty to-day of getting capable, proper foremen. In line with what Mr. Ingalls says, the Phelps Dodge Corporation to-day has a school for foremen.

Incidentally, Mr. Thayer told me the other day that in



Butte, at least 95 per cent of his underground foremen were technical graduates—those in charge of the miners—and that they really made the best foremen.

I may be wandering a little from my subject but I believe a great deal of the industrial trouble we have, the trouble between the young men and the company is due to the selection of improper foremen. The day has gone past in machine works, that is modern machine works, where because a man is an absolutely perfect operator on a lathe or a drill press or a shaping machine, he is made a foreman. That is not what he is there for. A man may be a very indifferent operator on a machine and yet make a most excellent foreman because of his knowledge of handling men.

To get back to the suggestions of Professor Peele in regards to this broader training of the workmen, I think undoubtedly it is a step in the right direction. Paying wages to a man, paying him good wages by no means satisfies him. There is something else that he must have, and I presume that what the workmen of the world are crying for to-day is that someone should realize that they are more than machines, that they are men. I am afraid the old time employer has not realized this. It has got to come and it is slowly coming. You hear a great deal about the intense weariness that comes from an oft repeated task, and it is so. Of course, there are certain tasks that unfortunately mean doing the same thing over and over again. It is hard to get a man to take an interest in his work who is simply running a car from one small chute to a large transfer chute seven hours a day, simply loading a car and pushing it and dumping it, and yet that work has to be done and the problem before us is how to get a man to have interest in that work.

Now, the more general knowledge that man has, assuming that he has intelligence, the better he is able to appreciate your problem. I have been thinking for a long time how, in the method of mining at Miami to which we are coming—that is, the caving system in which practically all that men do after breaking up the orebody is to draw from a certain number of chutes so many cars of ore and dump them in a transfer chute—how is it possible to get a man interested in that particular piece of work? And I think if the thing is studied carefully it can be done.

The secret of success in the caving method of mining is not so much in breaking the ore as it is in drawing it off after it is once broken. You can usually break up a body of ore so that it will draw, but unless you are extremely careful in your drawing, you get what is known as "piping"—you draw one chute

and the ore comes down in the form of a small cylinder, and the next thing you know you have "capping"—so the thing that governs is a very careful method of drawing. The chutes are laid out so that they are pretty close, say  $12\frac{1}{2}$  feet apart, and the ore is drawn—six cars from this chute, six from the next, six from the next and six from the next. We do not leave this to the foreman but have young engineers, men just out of college, and send them down as "chute checkers." They are there to see that just the requisite number of cars are drawn from each chute.

Now, it has struck me that if we tried to instruct our men, just those men who are drawing chutes and filling cars, if we tried to make a little plainer to them what we are really trying to do and why we don't let them draw from one chute one day and another chute the next day, that perhaps we might get an interest in the work instilled into their minds. I have no doubt that these men may think that there is some conspiracy, that instead of letting them go to No. 81 chute and draw all the ore for the shift there and then go to No. 82 chute next day, we are just trying to make it hard for them. I believe if our system of mining were explained to them, a time would come when we would not need chute checkers and that the men themselves would take an interest in drawing the ore carefully.

If there were some way such as is pursued in the mills where fine velvets are produced, of checking up quality of the work produced, then I think that we could give these men an incentive. Of course, in a mill producing fine velvets, it is easy to check up a piece of velvet after it is finished and show a man the mistakes that he has made. Now, if you were drawing a particular block of ground—we will assume that the assay value of that block determined from the drilling operation is 2.2 per cent copper and that you expected it to draw out 1.9 per cent copper—if the men did draw it out 1.9 per cent, you could pat them on the back and say they did great work; if it came out 1.8 per cent you could put it that they did not do as good work as you expected. But if that ore came out 2.1 per cent, then your theory would be knocked in the head. Of course, the explanation for that would be that that block of ore, instead of being 2.2 per cent, was a good deal higher than your crude methods of sampling had indicated.

However, I think that eventually something of this sort will be worked out and that it will be possible, even in such things as drawing ore out of a mine and tramming it, to secure the interest of the men. The more intelligence a man has and the better instructed he is, the better he will understand his

work. A man must have some knowledge of mathematics so that you can explain to him such things as the grade of the ore and what the effect of his drawing it with capping in it would be.

There is no difficulty when you come to the concentrator. There you can get your men interested simply by posting up every day what each shift did in each section, showing them the assay of the head, the tails, the concentrates, and ratio of concentration. You can do it in a smelter but, of course, it is pretty hard in a mine.

There has been written a very interesting article lately by a man named Wolfe, which I think was published in the proceedings of the American Society of Mechanical Engineers, about the wonderful effect he achieved in certain of the paper pulp works in Canada in getting the men interested in the operation of digesting the pulp with steam and  $\text{SO}_2$  gas. This was done by practically making every man on each digester, in one sense, a sort of a chemist or a physicist. He had before him his thermometers, and pressure gages, he had his cross-section sheets of paper upon which he could plot the results of the process as it was carried on. The net result was that in two or three years without raising wages, in the particular factory which Mr. Wolfe took hold of, the output was doubled. Now, touching upon a side question, the point was brought out that, although the product of those men was doubled, their wages were only increased 40 per cent which was not a square deal. That is neither here nor there. But there was a necessity for these men, before they did what has just been mentioned, to have a considerable added knowledge of mathematics and chemistry so that they might be able to understand what they were doing and to get this interest in the work. I agree with Professor Peele that the more education we can give these men, the more interest we can arouse in them in their work. As I said before, a man does a great deal much better work when he has an interest in what he is doing.

Up at Silver Bay on Lake George the other day we had a conference of 250 manufacturers. One man told a most interesting story showing how even the commonest workman gets terribly discouraged when he does not know what he is doing. He told us of a certain plant with which he is connected in which they had a leak in a buried water pipe. So they got a gang of Italians who were told to dig a hole at a certain place. They dug the hole and as the foreman did not find the leak he told the men to fill it up again; and he moved them off to another place and started another hole. That went on, hole after



hole, until three o'clock in the afternoon when the whole gang stopped and said "No good, no work more." He could not understand. He got an interpreter and found out that these men, although they were being paid by the day, were so disgusted with the idea of simply digging holes and then filling them up again that they absolutely were not going to work the rest of the day whether they lost their wages or not. The interpreter explained to them what they were doing and then their faces beamed all over. "Oh, yes, yes." Now they saw, and they went to work with a will to digging holes and looking for the leak. Any man, if you put him at work moving a pile of coal from one place to other and then back again, is going to lose interest in his work. What we have all got to do is somehow or other make a man's work interesting to him. The more knowledge he has, the better he is informed as to the principles of what he is doing, the more interest he is going to take in his work.

**Mr. Ingalls.**—The subject into which we have entered this evening is certainly one that offers boundless opportunity for discussion. The meeting is now open for discussion and I hope that many will express their own views following the lines that Professor Peele and Mr. Channing have given us.

**Mr. Knox.**—The subject touched upon is one, and I hope it is only one, of a series which will cover the whole subject of education from bottom to top, that is, from occupational education to post-graduate technical education. It seems to me that the various stages in education are more or less arbitrary. I foresee the time when, perhaps, it will be possible to go from stage to stage, when the workman will be able to work himself up to the position of foreman, from the position of foreman to that of engineer, and from engineer to the top of his profession. We may be far from that now, but it is not an impossible dream. I am particularly interested in one remark of Mr. Channing's to the effect that at Butte foremen are 99 per cent technical graduates. This seems to me an extraordinary condition. The foreman is usually chosen from the working force, the most capable among them and is usually a superior laborer. This is insufficient. He should be more than that. On the other hand, to take a technical graduate who has spent four years in the hardest kind of work and put him in the position of foreman seems to me a waste of material. He is in the wrong place. The position of foreman is essentially that of a workman. Mr. Channing has further pointed out the necessity for developing some interest by the laborer in his work. By putting technical graduates at work as foremen, it is removing from the laborer the

greatest possible interest he can have, the incentive to rise. Therefore I think in further consideration of this matter, it is most desirable that vocational education and the education of the foreman should be kept together as one subject, that the laborer should be encouraged to rise to that position rather than that the engineer should be encouraged to descend to it.

**Mr. Channing.**—I think Mr. Knox has made a very good point, namely, that we are not creating initiative in the miners when we make foremen out of technical graduates. I would like to hear if anyone else has had any experience along that line. Speaking from my own experience, I have had a few technical men as foremen, not a great many, and they usually have not been fresh young college graduates but men that have been out several years. Further, they have not been the lowest grade of foremen but usually men that were fairly well up, almost on the level of a mining superintendent. I think the point Mr. Knox makes is certainly very good; we are not encouraging the men themselves when we fill those places with technical men. Of course, on the other hand we must realize that, with the large number of mining schools such as there are in the country, there are a great many more graduates now than when Professor Peele and I were graduated.

**Mr. Knox.**—I wonder whether there is not too great an output of technical graduates in this particular field, more than the industry requires? If so, it is a great waste of expense and individual labor.

**Professor Peele.**—Several years ago, Professor Christie, of the University of California, wrote a paper for the "*Transactions*" of the Institute which attracted a great deal of attention and for which he received almost unlimited praise and congratulation. I always thought the basis for that paper or rather the conclusions, which he drew from his own investigations, were very faulty in that his data led him to believe that it would be impossible to multiply the number of mining schools in this country to such an extent as to increase the number of graduates to a point where there would be a surplus of young trained engineers; he rather favored the lowering of the standard of requirements for admission in order to increase the number of students. Possibly his thought was that universal education was the panacea for all industrial evils. I have thought that the flooding of the market, that has been noticeable for some time, where the young graduates are crowding each other on the field in an unfortunate way, would have caused him to draw a different conclusion from his investigation. That paper, I think, was

published about eighteen or twenty years ago. I am not certain, though, about that.

**Mr. Ingalls.**—I think that the point that Mr. Knox makes about depriving the miner of incentive to rise is a great deal more important than the point about marking down the technical graduate. Undoubtedly among the graduates of technical schools there is always a certain proportion of misfits, men who have been marked for the profession of mining engineer and have, perhaps, not been really suitable for any kind of engineering. I am inclined to believe that it is a common fault among young men who have been graduated from a technical school as mechanical engineer, mining engineer or any kind of an engineer, to think that he is one and that he has got to be one, that he has a feeling that any recognition on his part that he was not going to do well in his chosen profession would be a confession of failure which he would be very, very reluctant to admit. I have observed that a good many times.

**Mr. Knox.**—My point, Mr. Chairman and members, as to the marking down of the engineer was that of the very high cost. What the cost of a graduate engineer is, I do not know. I think we all know that it is a very expensive method—just what his cost to manufacture is we do not know—perhaps Professor Peele could enlighten us upon that subject.

**Professor Peele.**—I suppose a rough estimate of the cost of a four-year technical course, taking the mining courses in which we are most interested, in any of the schools in the large cities would approximate—I do not mean during war times but taking it on a pre-war basis—something like \$6,000 for the four years, say \$1,500 a year, and that would be fairly liberal. It could be done perhaps for \$5,000. That does not take into account the cost of preliminary education, the preparatory education.

**Mr. Knox.**—Would it not be fair to add \$1,000 per year for the loss of productivity during the course, bringing the total up to \$10,000?

**Professor Peele.**—Yes; I think if that item were added, \$10,000 would not be at all too much. Counting the cost of his preparation for college \$10,000 would certainly not be excessive.

**A Voice.**—Does that include his board or just education?

**Professor Peele.**—That includes his living expenses while a student, before he begins to earn money.

**Mr. Ingalls.**—That may be one of the inevitable wastes of



manufacture. Then the early retirement from a chosen profession in which so much has been invested may not be altogether waste either.

**Mr. Aldridge.**—What percentage of the men who are graduated as mining engineers ultimately follow that profession?

**Professor Peele.**—Probably 40 per cent.

**Mr. Aldridge.**—I do not think it is anything like 40 per cent.

**Mr. Ingalls.**—I think Mr. Knox ought to keep in mind the fact, too, that some of us feel that we have now what may be called first-class mine operators. Generally speaking, a mine operator is a fellow who has gone through that very experience of having worked in the mine, become shift boss, foreman, superintendent and finally manager.

**Mr. Channing.**—I think, Mr. Knox, although I have not followed the theories of the matter, that at Anaconda they do not take the young technical graduate and put him right in as foreman. I think that the student has to go out to Butte and work as a laborer for a least a year before he gets a chance to be made a foreman. He has got to go out and push a car and then go to work in the drifts and stopes so that he knows something of the practical side.

**Mr. Knox.**—I had in mind the case of the mining engineer. As a matter of fact I hope we shall be in possession of the figures of the Institution of Mining and Metallurgy, in England, upon post-graduate education, education of the engineer after graduation rather than before, in order to compare that with this system. It will be interesting to have those facts become available which, I hope, will happen within a few months.

**Mr. Ingalls.**—Well, is it not also the case that in Montana the mines are so big, and that operations are on so big a scale that a foreman in one of those mines is like a superintendent of some smaller mine.

**Mr. Channing.**—I suppose out of Butte Hill there must be mined 10,000 tons a day. When you realize that that is taken from a multitude of small veins each averaging, perhaps, 5 feet in thickness, you see it requires a tremendous amount of supervision and brains. There is really a multitude of foremen there as compared with what there would be in one of the porphyry mines because these veins have to be followed with the greatest care. A great deal of ingenuity is used in discov-

ering the proper method of driving, digging, sampling, stopping, carrying to the chutes and handling the filling. There is one thing that has long impressed me, and that is I think we may have a great many misfits in sending men through technical schools, in doing what Professor Eliot said over twenty years ago was wasting a \$2,000 education on a \$2 boy. What worries me more than anything else is the undoubted large number of boys whose fathers are mere laborers, who have natural ability and who do not get the opportunity to rise. I think that is probably one of our greatest economic wastes. It is unfortunate that a man with natural ability has not the opportunity of obtaining instruction and education to bring it out.

I am not opposed to education; I do not think that all the workers we need are just merely hewers of wood and drawers of water. I think it is up to us engineers to improve machines and methods so that eventually every one of our workmen will be really intelligent men who are directing machines and who are not using just their muscles.

You know, yourselves, how mining has changed in thirty years. There is very little shovelling to-day; there is no pounding of drills. Every man has become more and more a director of force produced by burning coal or falling water. I look forward to the time, although it will come long after I am dead—I look forward to the time when the mere exercise of physical force is going to be reduced to the very minimum. I think if we keep that in view, realize that that is what we are aiming for, that we can go at it, keep up this education and we will be certain not to lose it. Professor Peele and I heard at an industrial conference at Silver Bay, as I remember it, a statement made by the president of a large steel company to the effect that workmen could be educated to a certain extent on company time with propriety, that if you did that, there was a tremendous incentive to the men to study, and that in reality, as you eventually benefitted by it, you could to a certain extent afford to do it. Have you heard that advanced?

**Professor Peele.**—No, I have not, but I ventured to suggest in the remarks that I made first, that the cost of this education could be borne by the mining companies who were undertaking the education.

**Mr. Knox.**—Mr. Chairman, I think a great many of us present have read that current little book by a man named Leitch. You may remember that Leitch in his work early found that it was necessary to conduct all conferences, meetings and debates on company time, so that insofar as his system contains the

element of education, such education is certainly accomplished on company time.

**Mr. Channing.**—In talking with an Englishman yesterday, he said that all meetings of the shopmen at his company's works were held on company time.

**Mr. Lewis.**—Uplift work?

**Mr. Channing.**—They don't like uplift work; they hate the name "welfare," it is like a red rag to them. You can do a great deal of welfare work, if you only conceal it so they don't know it.

It is extremely peculiar, you know, how men will belong to the Y. M. C. A. and feel it is their own institution. They do not realize that you are putting up dollar for dollar; they do not think what you are paying out, as long as they are paying for it. You may put up or rent a building, furnish steam heat for it, keep it clean and cool in summer, pay a secretary's salary—that amounts to nothing with them. They pay their dues and they think they are running it, that it is their organization. Why, if you attempted to run that as a company club, you could not get them to come within a hundred yards of it, but they will come to the Y. M. C. A. because they have an idea it is their own organization.

**Mr. Keene.**—In Peru, in Burma and in Russia, whether he knows it or not, a man has to carry on this education to get enough of a staff together at all, and he has to be constantly at it. I presume in the case of the Burma company, their staff will be fairly well educated probably two years hence. The men there are constantly being put through a school and if a shift boss does not fall in line, he goes and another shift boss takes his place. In the course of time they will all be educated men there.

You were speaking of the caving system. At present the Burma company's orebody is not being mined by a caving system because of the difficulty of securing men who could do the work. But it was realized that caving would perhaps be started at a future date, so a class of about twenty-five men was formed who were carefully instructed in this work. Then other classes were formed, so that now they have about seventy-five men trained in this kind of work with the idea of using them at a future date. They have a type of laborer that is very different from those in the United States, but the men took to the work very keenly.

**Mr. Channing.**—You can educate men. When we started in



Tennessee, we had to provide a force of about 1,000 men who were all native mountaineers. Of course, there was a sprinkling of men who knew something about mines because, although the district had been shut down for about twenty years, there were miners left. So it was not difficult to secure a crew of miners, but when it came to the smelter and power house, those men knew nothing about such work. Before many years we were running that power house and smelter entirely with natives. Those men were most excellent. In the converting department we had a most interesting experience; we had two converter foremen, both of them from Montana, and one of them we let go down to Atlanta on a vacation. The other one was managing the converting, really doing it day and night. One day he was taken sick so that the native crowd came on in the morning with no outside foreman. It was the chance of their very lives. They made more copper that day than they had ever made before. To-day the best converter foreman down there is a man named Scotty Allen, who eighteen years ago was really a hill-billy, and I venture to say there is no better converter foreman in North or South America or Mexico than that same Scotty Allen. It simply shows what you can do with those men who really have some native ability.

I believe the same thing happened down at Nacozari the time that all of the Americans left. They left the mine and concentrator entirely to Mexicans and I was told to-day that during six weeks that they were away, the Nacozari concentrator ran through the largest amount of ore, and made the largest amount of concentrates it had ever produced in its record.

Mr. Townely told us yesterday at a luncheon that one of his subsidiary concerns got a contract to make shells and that they knew just exactly what they were going to get for these shells; the material was all contracted for and they got the men together and fixed the best price for the work and said to the men: "Here now, these prices are fixed; they are fixed for the life of this contract. As long as we are running and we have this contract, these are going to be the prices and we are not going to cut on you at all." He said that that was the one factory where they had the least overhead loss, less disturbance and less trouble than at any other one. He said they did not have to jack the men up for not doing enough work. There was a certain line of work in which there were nineteen different operations on a shell; if the eleventh man was slow, he had the ten men behind him jumping on him to know why he did not hurry up and eight men ahead of him jumping on him also.

If that man did not do enough work in a day or two he would be fired and somebody else put in his place.

I think one reason why the labor interests in the United States and in England—I will say more particularly here—have so resisted the introduction of piece work is that for the last eighty years they have been most abominably treated by employers. Just as soon as they put men on piece work and a man or a group of men succeeded in doing good work, directly the price was cut a little. So after eighty years of that kind of treatment they are suspicious of any such thing as piece work and I do not think they are to be blamed for it. The whole system of fifteen or twenty years ago in which, if a man did double work, you paid him only 50 per cent extra, is absolutely wrong. Mr. O'Neill was telling us the other day that under their present system if a man does double work he gets more than 100 per cent added. In this case your saving is in the cutting down of your overhead.

I have tried—of course, this is far off the subject—I have tried very hard in Miami to see if there is not any possible way of putting men on a production basis. In slicing you are unable to do it, unless it be a graded payment, because if you put men on a tonnage basis they are very liable to neglect the timbering and a mistake in timbering in a mine by which men are killed or injured would knock out all the gain you could get by increased production.

Of course, the unfortunate thing is that often with higher wages the efficiency of labor has gone down. In slicing, the one thing we can measure is the amount of shoveling. Before the war I should say the average shoveling was about 18 tons a day. Now it is not over 12. Now there is a falling off of 33 1-3 per cent in efficiency. In the case of manufacturing, you can take your costs in detail and show the men what you are doing, but in such a thing as mining, particularly of those metals which are relatively rare, such as copper, you have not a manufacturing concern in operation at all. What you are doing is converting some wealth into a form that is economically more valuable.

**A Voice.**—How do you account for that falling off in efficiency?

**Mr. Channing.**—Simply because there has not been any surplus of labor, that is all. When there are fifty or sixty men at the gate, capable men, all looking for work, your men are going to work harder. If there are fifty or sixty men at the gate, of

which only one or two or three you possibly can hire, why then your men won't work.

**A Voice.**—Have not labor organizations something to do with it, too?

**Mr. Channing.**—No, because the labor organizations are not strong. I think it is absolutely owing to a shortage of good men. We are facing a shortage of men to-day. One reason why we are changing over in the Miami mine from the slicing to the caving method is because it is going to reduce the number of men. I know absolutely that we are going to reduce the grade of the ore, we are going to dilute it, we are going to lose some of it, and yet it means that we are going to do the work with 300 instead of 600 miners.

**Mr. Ingalls.**—Of course, when there are no competitors at the gate, the man who is inside does not feel that he has to work hard in order to keep his job, but why does he let his performance fall down from eighteen to twelve. I cannot understand the fact at all. It has been observed in a great many places that as the rate per hour increases, less hours are devoted to work and that efficiency decreases, the men simply do not want to work.

**A Voice.**—Is that spirit general?

**Mr. Channing.**—I think it must be because I heard an industrial worker say that during the war he went down into one of the coal districts—that was a year ago. Labor Day was on Monday and on Tuesday there was nobody working at the mine and the miners were debating whether they would go to work on Wednesday. In accordance with the decisions of the War Labor Board those men were making \$13 a day and very few of them wanted to work more than three days a week.

**Mr. Ingalls.**—If that is the case, how is any stimulus of bonus or participation in profits or any scheme of that kind going to increase production?

**Mr. Channing.**—I don't believe it is.

**Mr. Knox.**—I wonder whether the situation that our Chairman describes is not owing, perhaps, to other causes also, whether it is not the general slackness of labor prevailing, independently of the shortage?

**Mr. Channing.**—I have an idea that the healthiest condition of an industry is when there is a slight shortage of labor, a



little more demand for labor than supply. If that is true, it would account for the fact that the American workmen are the most efficient in the world. There has been a slight shortage of labor in this country except in instances of depression, whereas in Europe they have had labor in excess. That seems to be the cause which has produced the high efficiency and the chief cause perhaps of the high efficiency of this country as compared with European labor. Now we have that to an accelerated degree, perhaps, to be sure, but is there not also a problem—is it not possible to lay down the conditions to be attained in order to get workmen to work apparently regardless of the reward that is offered to them?

**A Voice.**—I think, Mr. President, there are three primary causes. I think the first, as Mr. Channing says, is that there is a slight shortage of labor; I think the second is owing to the fact of the greater strength of the United States as compared to the strength of the Europeans, and I think the third cause and perhaps the chief one is probably what Mr. Knox has in mind, that is, the constant proclamation of socialists and other orators by which our employees are led to believe that they have been buncoed, that for a great many years they have not been getting a square deal, and that under those circumstances they are inclined to do just as little for the amount of money that is necessary as they can get away with. In Arizona we have had a very good example of this. You may have happened to have read some of those speeches in which some of the prominent leaders have stated that whether they got four, five, six or seven dollars a day is nothing, that the unions will not be satisfied until the owners of properties operate them on some basis by which the capitalist receives a reasonable rate of interest on his mine and the balance goes to the men working in the mine.

I think that probably this last cause has more to do with the falling off of the efficiency of the workmen than almost anything else.

After further desultory remarks the meeting adjourned.

F. F. SHARPLESS,  
*Secretary.*

## COUNCIL.

Meeting of September 23, 1919.

A meeting of the Council was called by the President for September 23, at the Columbia University Club, New York City. Owing to absences from the city a quorum failed to attend and the President convened a meeting of the Executive Committee.

There were present Mr. Knox, Mr. Ingalls, Mr. Penrose and Mr. Sharpless.

The minutes of the previous meeting were approved as printed. The Secretary announced the election of T. W. Mather, A. W. Allen, C. A. Meissner and C. A. Mitke.

**Engineering Council.**—A report was made respecting the action of the conference of engineers, architects and constructors looking toward the formation of a Department of Public Works. The representative of the Society to this conference, J. P. Channing, has reported from time to time upon the activities of the committee in charge of this matter.

M. O. Leighton, chairman of the executive committee, has advised the Society's Secretary that the financing of the committee would be done by voluntary contribution. The Secretary was instructed to publish a statement to this effect in the next *Bulletin* in order that members interested in the subject might contribute.

**National Chamber of Commerce.**—In response to the request of the National Chamber of Commerce the President appointed Hennen Jennings and W. R. Ingalls delegates to represent the Society in that body, Mr. Jennings being named as National Councillor.

**Presentation Committee.**—A report of the Presentation Committee on the award of the medal of 1919 to Charles Eugene Schneider was presented with request for advice as to the manner of presentation. Upon vote of the committee it was decided to make the presentation at a dinner given by the Society to which would be invited a number of distinguished iron and steel metallurgists, a portion of the expenses to be borne by voluntary contributions.

In addition to Messrs. Spilsbury, Stone and Corning, Mr. Stoughton, Professor Kemp and Dr. Drinker were asked to serve upon the Presentation Committee.

**Award of the Medal for 1920.**—Subjects considered as presented by members were as follows:

1. For recognition of services rendered to the mining industry in devising methods which, by the employment of hydrometallurgy, have made possible the successful treatment of ores not otherwise commercially profitable.
2. Some basis in connection with the war.
3. Chemistry in connection with the war.
4. Physics in connection with the war.

5. In recognition of services rendered in devising methods of mining which have made it possible to operate large deposits of low-grade ore at a profit.

6. For distinguished services in the art of mining or advancement in mining methods.

7. Research in the fundamental sciences of chemistry or physics as they affect mining.

After a full discussion of the various subjects by the Executive Committee it was voted to award the medal in 1920 for distinguished services rendered in the art of hydrometallurgy.

**Resignation of Louis D. Huntoon.**—The resignation of Louis D. Huntoon as Secretary-Treasurer was read and accepted. Upon vote of the committee Frederick F. Sharpless was appointed Secretary-Treasurer to fill the unexpired term of Mr. Huntoon.

**Bureau of Mines.**—Robert Linton was appointed delegate of the Society to attend the dedication of the buildings of the U. S. Bureau of Mines at Pittsburgh, September 29 to October 1.

**Membership Distribution.**—Upon vote it was decided to retain the geographical distribution of members as adopted for the year 1919.

**Dufourcq Resolution.**—The Secretary reported the result of the canvassing ballot in reference to the death of E. L. Dufourcq. The vote was unanimously in favor of the resolutions which have already been published.

**Amendments to By-Laws.**—The Secretary reported that the changes recommended in the by-laws had been carried by practically a unanimous vote.

**Committee on Economics.**—At the meeting of the New York Section of June 5, 1919, the chairman of the committee read the following declaration:

There should be concerted effort to show labor, as it can be shown, that by sound economic theory labor is the residual claimant upon the produce of industry; that its residual claim in the United States is 70 to 80 per cent of the whole; that statistics prove that labor gets it; that statistics show that as mind increases the produce of mere manual labor, the latter



gets the major part of the increment; that the part of the produce of industry that labor does not get, it cannot get by any economic means; that in trying to get by confiscatory means more than its residual share, labor not only does not get it, but also loses more or less of what it was previously getting as its residual share; that the only way that labor can get any more than it does now is to produce more; that slacking in any form, either by working full time at any partial efficiency, or by working only part of the time, is directly opposed to labor's own interest, and that labor is the greater sufferer thereby than anybody else.

This was a preamble to a discussion of the labor problem. Later the declaration was sent to the Council for its consideration.

It was moved and carried that the President of the Society be instructed to take such action as is necessary to bring the declaration before the membership for vote of approval or disapproval.

**Annual Dues.**—The matter of dues for the year 1920 was discussed at some length. It would appear from a budget prepared by the Secretary that the expenses for the year 1920 will approximate \$5,000. Some method consistent with the interests of the Society must be found for raising this amount or the budget must be reduced. No conclusion was reached beyond authorizing the President to take such action as deemed wise looking toward the reduction of dues for 1920.

The meeting adjourned.

F. F. SHARPLESS,  
*Secretary.*

## OBITUARY.

### HENRY A. J. WILKENS.

Henry A. J. Wilkens was born in Baltimore, Maryland, on December 18, 1867, the son of Henry and Therese Wilkens. He received his early education at the Friends School in that city and at the age of fifteen entered Lehigh University. There he took the scientific course, being graduated in 1887, one of the youngest men in his class, with the degree of Bachelor of Science. He took a year's post-graduate work at Lehigh, receiving in 1888 the degree of Mining Engineer.

In September, 1888, Wilkens matriculated at the Royal Mining Academy, Freiberg, Saxony, as a special student. He remained at Freiberg studying under Ledebur, Richter and other famous German professors for two years and spending the vacations in taking practical courses at mines and smelters throughout Germany. On completion of the course he was given the usual certificate stating he had completed his studies satisfactorily.

In the fall of 1889 he returned to the United States and after a short period in the employ of the Empire Zinc Co., at Joplin, Mo., was engaged by St. Louis mining interests to take charge of a small mine that they were prospecting and developing in the mountains east of San Diego, Cal.

The summer of 1890 he returned to the East and took the position of chemist for the Lehigh Zinc & Iron Co., at South Bethlehem, Pa. This was the beginning of a friendship and business association with August Heckscher and John Price Wetherill that continued for many years. Mr. Heckscher, in speaking of his work at that time, said that Wilkens was so quick with his analyses that for sometime they suspected him of guessing at results, but that the most careful checks showed that he was always correct in his determinations.

In the summer of 1891, still in the employ of the Lehigh Zinc & Iron Co., he was sent to the Franklin mine as mine engineer and surveyor, and remained there throughout the time of the sinking of the Parker shaft.

In the winter of 1894 and 1895, with the late H. B. C. Nitze he entered the employ of the Geological Survey of North Carolina, and under the direction of Dr. Holmes then State Geologist, made a complete survey of the gold deposits of the Southern Appalachian Range extending from North Carolina to upper central Alabama. As a result of this work, he and Nitze collaborated in writing two articles, one entitled "Gold Mining in North Carolina and Adjoining South Appalachian Regions" which was published in the North Carolina Geological Survey Bulletin No. 10, and the "Present Condition of Gold Mining in the South Appalachian States" which was published in Volume XXV of the *Transactions* of the American Institute of Mining Engineers. About this time, in collaboration with Nitze, he also wrote an article on the "Magnetic Separation of Non-Magnetic Material" which was published in Volume XXVI of the *Transactions* of the American Institute of Mining Engineers.

In the latter part of 1895 he entered the employ of the Wetherill Concentrating Co., at South Bethlehem, Pa., and for the following two years he was engaged in work connected with the development and marketing of the Wetherill magnetic separator. In the winter of 1897 he went to Europe as a representative for that company, and after long and difficult

negotiations sold the world's rights to the Wetherill patents to interests connected with the Metallurgische Gesellschaft, Frankfort, Germany, reserving, however, the rights to use the process in treating the ores of the New Jersey Zinc Co. and its subsidiaries.

Returning from Europe in the summer of 1897, Wilkens on October 1 of that year entered the employ of the New Jersey Zinc Co. His first duties consisted of general supervision over the operations of the Empire Zinc Co., a subsidiary of the New Jersey Zinc Co., in Missouri, and he was also largely connected with the development of the Schroeder contact process for the manufacture of high-grade sulphuric acid. By means of this process the first acid of this kind was manufactured in the United States. In 1900 the Empire Zinc Co., of Colorado, was formed and an office was established in Denver. The operations of this company also came under Wilkens' supervision, as well as the building of the mill at Canon City in 1901. During this and following years Wilkens was in general charge of all of the western operations of the New Jersey Zinc Co., the Kansas Gas Smelters and various properties in the southwest and in Mexico. He examined and reported on many mining properties, among which were La Bufa and La Penescosa in Mexico and the Wythe mine, in Virginia, and the Bertha.

On March 1, 1908, he resigned his position with the New Jersey Zinc Co. From then until the latter part of 1911 he practised his profession as consulting mining engineer and during this time made an extensive trip through the West Coast countries of South America, examining many mines and prospects. In December of 1911 he became president of the Mines Management Co. During the next few years, through his connection with that company he was instrumental in the rehabilitation of several of the old iron mines of New Jersey and Pennsylvania, notably the Mt. Hope and Washington mines of the Empire Steel & Iron Co.

On January 1, 1916, he resigned as president of the Mines Management Co., and with Walter B. Devereux, Jr., formed the consulting mining engineering firm of Wilkens & Devereux, of which he was the senior partner at the time of his death.

On August 1, 1918, Wilkens and Miss Gertrude Wetherill, the daughter of Mrs. William C. Wetherill and the late Mr. Wetherill, were married in Denver, Colo.

For the past three years Wilkens had been far from well and during that time was forced to undergo three major operations within a relatively short period. He never fully recovered from the shock and strain of these operations which undoubtedly was responsible for the sudden weakening of the



heart which culminated fatally at Pueblo, Colo., on the morning of September 13.

Wilkens was a member of the Mining and Metallurgical Society of America, the American Institute of Mining and Metallurgical Engineers, and the following clubs and societies: Racquet and Tennis, City Midday Club and New York Athletic Club, of New York, Rittenhouse Club, of Philadelphia, University Club, of Denver, Delta Phi Fraternity, of Lehigh University, Lehigh Alumni Association and the Pohoqualine Fish Association.

Wilkens always refused to become a slave to business and stoutly maintained that work was the least important thing in a man's life. While able to concentrate his keen analytical mind, to the exclusion of everything else, on business matters, he also possessed the happy faculty of being able to forget business completely in vacation time. A crack shot and expert fisherman, his happiest days were those spent with his rod or gun with some chosen companion. The size of his catch or the number of birds mattered little to him. What he enjoyed was the outdoor life and, when shooting, watching and studying the working of his dogs. He was a close observer, student and lover of nature and possessed an exhaustive knowledge of flora and fauna. His desire for companionship was so great that he always wished to be with friends and was never really happy when alone. His love of children was remarkable and they all loved him. During the last years of his life he took intense interest in a Fresh Air Home for little girls and helped it greatly in financial and other ways. Of his sterling character, his kindliness, his charitableness and loveliness, the many devoted friends he leaves behind him are best proof.

# STANDING COMMITTEES

## Executive Committee

H. H. KNOX  
POPE YEATMAN  
W. R. INGALLS  
R. A. F. PENROSE, JR.  
F. F. SHARPLESS

## Occupational Training

CHARLES A. MITKE, *Chairman*  
STANLY A. EASTON  
BENJAMIN F. TILLSON

## Standardization

C. R. CORNING, *Chairman*  
J. PARKE CHANNING  
GEO. C. STONE

## Technical Education

A. H. ROGERS, *Chairman*  
L. C. GRATON  
H. A. GUESS

## Post-Graduate Education

R. GILMAN BROWN, *Chairman*  
POPE YEATMAN  
FRED HELLMANN

## Economics

W. R. INGALLS  
J. R. FINLAY  
F. W. BRADLEY

## Chrome

E. G. SPILSBURY  
ALBERT BURCH  
MILNOR ROBERTS

## Research

G. D. VAN ARSDALE

## Molybdenum

S. H. BALL

## Mercury

F. F. SHARPLESS

## U. S. Chamber of Commerce

W. R. INGALLS

## PAST PRESIDENTS

|                                 |                        |
|---------------------------------|------------------------|
| HENRY S. MUNROE.....1908-1909   | JAMES F. KEMP.....1914 |
| J. PARKE CHANNING.....1910-1912 | W. R. INGALLS.....1915 |
| HENRY M. CHANCE.....1913        | J. R. FINLAY.....1916  |
| W. R. INGALLS.....1917-1918     |                        |

## FORMER SECRETARIES

|                            |                             |
|----------------------------|-----------------------------|
| J. R. FINLAY.....1908-1909 | W. R. INGALLS.....1911-1914 |
| HENRY S. MUNROE.....1910   | F. F. SHARPLESS.....1915    |
| LOUIS D. HUNTOON .....     | 1916-1919                   |

## GOLD MEDAL

|                               |                      |
|-------------------------------|----------------------|
| 1914 } HERBERT C. HOOVER      | 1916 JAMES F. KEMP   |
| 1915 } LOU HENRY HOOVER       | 1917 E. P. MATHEWSON |
| 1915 ROBERT H. RICHARDS       | 1918 POPE YEATMAN    |
| 1919 CHARLES EUGÈNE SCHNEIDER |                      |





# Mining and Metallurgical Society *of America*



Bulletin Number One Hundred Thirty-six  
November and December, 1919  
Vol. XII, No. 9

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## OFFICERS FOR 1919

*President*, H. H. KNOX, 17 Madison Ave., New York.

*Vice-President*, F. F. SHARPLESS, 17 Madison Ave., New York.

*Secretary-Treasurer*, F. F. SHARPLESS, 115 Broadway, New York.

*Executive Committee*, MESSRS. H. H. KNOX, W. R. INGALLS, R. A. F. PENROSE, JR., F. F. SHARPLESS, POPE YEATMAN.

## COUNCIL

At large, *ex-officio*,

H. H. Knox, New York.....Retires January, 1920

F. F. Sharpless, New York.....Retires January, 1920

Louis D. Huntoon, New York.....Retires January, 1920

Districts 1-2-3-4, New York, New England, and Eastern Canada:

W. R. Ingalls, New York.....Retires January, 1922

J. V. N. Dorr, New York.....Retires January, 1921

Pope Yeatman, New York.....Retires January, 1921

W. Lindgren, Cambridge, Mass.....Retires January, 1920

District 5—Pennsylvania.

R. A. F. Penrose, Jr., Philadelphia.....Retires January, 1920

District 6—Ohio, West Virginia, Maryland, Virginia, North Carolina, District of Columbia, and New Jersey.

R. M. Catlin, Franklin, N. J.....Retires January, 1920

District 7—Minnesota, Wisconsin, Michigan, Iowa, Missouri, Arkansas, and Kansas.

E. B. Kirby, St. Louis, Mo.....Retires January, 1920

District 8—Colorado, Utah, and South Dakota.

R. C. Gemmell, Salt Lake City, Utah.....Retires January, 1921

Districts 9-10—Northern California, Nevada, and Alaska.

Albert Burch, San Francisco, Calif.....Retires January, 1920

F. W. Bradley, San Francisco, Calif.....Retires January, 1921

District 11—Southern California, Arizona and Texas.

Ralph Arnold, Los Angeles, Calif.....Retires January, 1922

District 12—Washington, Idaho, Oregon, Montana, and Western Canada.

C. W. Goodale, Butte, Mont.....Retires January, 1922

## OFFICERS OF SECTIONS

### SAN FRANCISCO

Frank H. Probert,

*Chairman.*

Edwin Letts Oliver,

*Sec.-Treas.*

### NEW YORK

J. A. Church,

*Chairman.*

G. D. Van Arsdale,

*Vice-Chairman.*

A. P. Watt,

*Secretary.*

S. H. Ball,

C. M. Weld.

### PHILADELPHIA

R. H. Sanders,

*Chairman.*

DOUGLAS, ARMITAGE & McCANN, New York, Counsel for the Society.

# Mining and Metallurgical Society *of America*

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Vol. XII, No. 9 November and December, 1919

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Bul. 136

## ANNOUNCEMENTS.

**Annual Meeting.**—The annual meeting of the Society will be held at the Columbia University Club, 4 West 43rd Street, New York, January 13, 1920. There will be two sessions, the first at 2 p. m. for the election of officers, presentation of reports and other routine business; the second session will be held at 8.30 p. m. It will be preceded by a dinner at 6.30 p. m.

Official notice of the annual meeting, together with a proxy blank, has been sent to all members. Those who have no expectation of attending this meeting are urged to return their proxies, properly executed, to the Secretary. It is necessary that at least one-third of the members of the Society be present in person or by proxy in order that the business of the annual meeting may be conducted. Hence the urgency of returning the proxy.

**Engineering Council.**—Among those matters in which Engineering Council is now taking an active part is one of peculiar interest to the mining industry, namely, the Boston-Washington Super-Power Line. The following action was taken at the meeting of Engineering Council, October, 1919:

Engineering Council appreciating the importance of conserving our national fuel resources, of equalizing the cost of power and of relieving railroad congestion; and Engineering Council believing that the density of traffic and of industrial consumption of power in the territory adjacent to the northeastern Atlantic seaboard is sufficient to justify physical and economic relief by the application of the principles inherent in super-power generation and distribution, he it resolved, that Engineering Council endorses legislation making a suitable appropriation for the proposed investigation as a measure conducive to the national welfare.

The Secretary of the Interior has included this item in his estimates of required appropriations by the U. S. Geological Survey:

For a survey of power production and distribution in the United States including the study of methods for the further utilization of water-



power, and the special investigation of the possible economy of fuel, labor, and materials resulting from the use in the Boston-Washington industrial region of a comprehensive system for the generation and distribution of electricity to transportation lines and industries, and the preparation of reports thereon, \$250,000.

Engineering Council asks the co-operation of this Society and of its individual members in this, which is really a national project of conservation. It is pointed out that the waste of fuel in small uneconomic plants is enormous. From 35 to 40 per cent of railway cargo space is consumed with transportation of fuel. Of the fuel placed upon railways 7 per cent is consumed in its own movement. Wastage at the mines is large. Only a small proportion of the available water power along the lines of transportation and within the area where it is needed has been developed.

The time has now arrived when in certain sections of the country the power load is large enough to justify the installation of a super-power transmission line, into which will be fed electrical energy generated by high-powered, high economy steam and hydro stations, and from which power will be delivered to the consumer, railroad or industry, with an expenditure of from one-third to one-half the amount of coal now burned; also, while the above operating economics will be effected, a far greater utilization of present generating equipment will be secured through the interconnection of the plants by the super-power transmission line, thereby permitting their aggregate capacity to be available wherever and whenever power is required.

It may be said if enormous waste in certain sections of the country can be proved, and it can be (it is not less than \$300,000,000 a year), do we not, looking toward the conservation of our natural resources, owe it to national, public and private interests to demand the investigation suggested by the Department of the Interior, so that its report may be made a public document, pointing out the ways and means of saving this immense yearly sum of money, while automatically lifting the heavy burden of unnecessary transportation now placed upon the railroads?

## COMMUNICATIONS.

**Labor as the Residuary Legatee.**—Several communications have been received by the Society respecting the term "residuary legatee" as used in the referendum recently issued to the

members of the Society. The fear was expressed that the Society might be understood as favoring the idea that labor should have the "residue" if any were left after the landlord or capitalist had taken all that he wished for his share.

These letters have been placed before the Committee on Economics and have brought to the Secretary the following communication.

Dec. 5th, 1919.

F. F. Sharpless, Secy.  
115 Broadway, New York City.

Dear Sir:

Some communications that have been received from members of the Society with respect to the referendum that is now before the Society, upon the initiative of the Committee on Economics, have been brought to my attention. These communications have exhibited a misconception of what is meant by the economic theory of the "residual claimancy of labor." That theory does not mean that the landlord, capitalist and entrepreneur take out of the produce of industry what they want and leave to labor merely the residue, but it means that certain charges and costs must be taken out by the landlord, capitalist or entrepreneur or the business can not continue to exist and these charges are severely limited by economic conditions. While the laborer gets practically all that remains, he is the residuary legatee in the same sense as one who benefits from a will after a fraction of an estate has been disposed of specifically. In other words, if the produce of industry is increased, labor eventually gets the entire benefit of the increase. General Francis A. Walker, the greatest economist that America produced, was the chief exponent of this theory and elaborate discussions of it are to be found in his economic treatises. A concise summary may be found in my paper on "Industrial Co-operation," presented to the Canadian Mining Institute last spring.

My special inspiration for this communication is a letter from Mr. J. C. Welch, in which the following remarks are made: "Seeing much of labor in this part of the country I should say there is not so much of an idea of further increase in wages (providing living cost does not still increase) but a fear that increased production, resulting in lowering present living cost, will automatically cause an effort to lower wages—thus tending to place labor back where it was before the war instead of leaving it somewhat better off than formerly."

My present comments are in no way to be considered as a criticism of Mr. Welch, but distinctly as a criticism of the dangerous state of mind on the part of labor that he reveals. The economic troubles of the present time may be expressed by the simple formula of under-production and over-consumption. Everything else, such as inflation of the currency, may be dismissed. The Federal Reserve Board and the Treasury Depart-

ment of the United States agree that the expansion of currency in this country has been an effect, not a cause.

Now if labor is deliberately curtailing production in order to maintain the existing scale of wages, it is contemplating economic suicide. It is in the same position as the man who is sawing off the limb of the tree on which he is sitting. The produce of labor expressed in terms of money is nothing but an expression. Labor would be in a desperate position if it were receiving money wages of \$100 per day and there were no goods for it to buy. The laborers of Russia have learned this. The essential trouble of labor in this country at the present time is that there are not goods enough to be divided among everybody. In fact, the dividend of actual goods is less than it was in 1916 and the number of people is greater. If the dividend be further reduced by the deliberate action of labor, the situation will become worse and eventually there will be financial panic in this country and hunger and cold among all people. As things are going at present that day is not very far away and the disaster will overtake us unless we switch quickly into a new road.

Anybody with ordinary common sense ought to see that the apparent prosperity of the present time, and the ability of some people to buy motor cars, furs, jewelry, silk clothing and other luxuries is absolutely fictitious. If a great war, with its enormous destruction of wealth, can produce such prosperity as the people, who have been living in a fool's paradise, imagine it would follow logically that it would be a good idea to have a great war every five or ten years. It would not be necessary to kill anybody. Simply, mobilize 25,000,000 men in Europe and let them go through maneuvers two or three years. Of course, this is a *reductio ad absurdum*.

Yours very truly,

(Signed) W. R. INGALLS.

## COUNCIL.

### Meeting of November 10, 1919.

A meeting of the Council was held at the office of the Society, 115 Broadway, New York, November 10, which was attended by the President, Mr. Knox, by Mr. Ingalls, Mr. Penrose, Mr. Yeatman and the Secretary, Mr. Sharpless.

**Dues in 1920.**—Since the previous meeting of the Council, held on September 23, a circular letter was sent to all members of the Council setting forth the financial condition of the Society and its needs for the year 1920. Briefly stated the situation is as follows:

On January 1, 1917, the treasury of the Society contained



about \$4,000, representing the accumulation of small balances for every year since the founding of the Society. With the outbreak of the War and the participation of the United States in war activities, it soon became apparent that the Society could render much useful service to the Government and to the Nation. A salaried assistant secretary was appointed to give all of his time to the affairs of the Society. The Council authorized the use of accumulated funds, and the dues were raised to \$20 per annum for the period of the War and one year thereafter. With the cessation of hostilities and completion of demobilization the activities of the Society diminished, so that on July 31, 1919, the expenses of the organization were cut down to approximately what they had been before the war. These low expenses could not be equalled, however, because of the advances in rent, printing, stenographic services and all other expenses to which the Society is subject.

A careful estimate indicates that the Society will need about \$5,000 for its activities during 1920. This is entirely aside from compensation to any of its officers whose services are now rendered gratuitously.

The members of the Council, appreciating the fact that there are many burdensome expenses to which engineers are now subject, believe that they should interpret the by-laws to the effect that the War ceased with 1918, automatically reducing the dues for 1920 to \$10. The present by-laws provide that the annual dues shall be \$20, "during the period of the war and one year thereafter."

Dues at \$10 will not, however, produce the required income and it was the unanimous opinion of the Council that, following the precedent of the Institution of Mining and Metallurgy, of London, the members should be given an opportunity to add to their dues such an amount as they felt was proper under the circumstances, and the Secretary was instructed to send a letter to each member with this in view.

## **Referendum upon Resolution of Committee on Economics.—**

The resolution of the Committee on Economics submitted to the New York Section on June 5, 1919, reads as follows:

Resolved: That there should be concerted effort to show labor, as it can be shown, that by sound economic theory labor is the residual claimant upon the produce of industry; that its residual claim in the United States is 70 to 80 per cent. of the whole; that statistics prove that labor gets it; that statistics show that as mind increases the produce of mere manual labor, the latter gets the major part of the increment; that the part of the produce of industry that labor does not get, it cannot get by any economic

means; that in trying to get by confiscatory means more than its residual share, labor not only does not get it, but also loses more or less of what it was previously getting as its residual share; that the only way that labor can get any more than it does now get, is to produce more; that slacking in any form, either by working full time at only partial efficiency, or by working only part of the time, is directly opposed to labor's own interest, and that labor is the greater sufferer thereby than anybody else.

At the meeting of the Council held on September 23, the Secretary was instructed to submit this resolution to all of the Council for a vote as to whether it should or should not be submitted to a membership referendum; as a result of the Council vote, the Secretary was instructed to submit the resolution to a vote of the membership.

**1920 Medal.**—Nominations for candidates for the 1920 Medal of the Society for distinguished service in the Art of Hydro-metallurgy were opened and the President named a committee to study the claims of the candidates and present its report to the Council.

**Nominations for Officers and Councillors.**—The Secretary submitted a tabulation of the nominating votes that had been received for officers and Councillors, after the examination of which the Council instructed the Secretary to issue the following ballot:

| OFFICERS          |                  |                       |
|-------------------|------------------|-----------------------|
| <i>President</i>  |                  | <i>Vice-President</i> |
| George C. Stone   |                  | W. Y. Westervelt      |
| Waldemar Lindgren | <i>Secretary</i> | Fred Hellmann         |
|                   | F. F. Sharpless  |                       |
| COUNCILLORS       |                  |                       |
| DISTRICTS 1-2-3-4 |                  | DISTRICT 5            |
| H. H. Knox        |                  | E. T. Conner          |
| S. H. Ball        |                  | William Griffith      |
| J. P. Channing    |                  | R. A. F. Penrose, Jr. |
| DISTRICT 6        | DISTRICT 7       | DISTRICTS 9-10        |
| F. G. Cottrell    | H. V. Winchell   | F. L. Sizer           |
| L. C. Graton      | James McNaughton | F. H. Probert         |
| B. F. Tillson     | Arthur Thacher   | Albert Burch          |

**Personals.**—In order to save expenses the Secretary was instructed to discontinue the publication of personals in the *Bulletin*.

**Suggested Modifications of By-Laws.**—The following suggestions were made for the consideration of the Council:

- a. Past presidents to serve as ex-officio members of the Council.
- b. Election of officers to be announced two weeks before the annual meeting.

c. The Gold Medal to be awarded from time to time as may be determined by the Council rather than at a fixed date.

These were merely tentative suggestions which it was thought might be of benefit to the Society and were offered with the idea of being discussed at a later date.

**Participation in Conferences.**—With the growth of the Society, and as the quality of its membership and realization of its services have become widely recognized, more and more frequent calls are made upon it requesting the appointment of delegates to State and National conferences touching upon almost an infinite variety of subjects.

This matter was brought to the attention of the Councillors by the Secretary with a request that the Council should adopt some definite policy in reference to such invitations.

After some discussion in which the members of the Council voiced their appreciation of the honor the invitations carried, the Secretary was instructed to decline courteously all requests for the appointment of delegates except in those cases wherein the Society was especially interested.

The meeting then adjourned.

F. F. SHARPLESS,  
*Secretary.*

## MEETINGS OF SECTIONS.

### NEW YORK SECTION.

**Meeting of October 21, 1919.**

The New York Section of the Mining and Metallurgical Society of America held a meeting at the Columbia University Club on October 21. Thirty members and guests attended. The Chairman of the New York Section, Sidney H. Ball, presided. The following officers for the Section were elected for the year 1919-1920: Chairman, John A. Church, Jr., vice chairman, George D. Van Arsdale, secretary, A. P. Watt.

The subject for the evening discussion was "The Wealth and Income of the United States." Mr. Ingalls opened the discussion with a summary of a paper that he had prepared upon this subject and followed the summary by quoting a few paragraphs in detail to bring out more forcibly the points that he made. The summary of the paper follows:

**Mr. Ingalls.**—The main conclusions of this paper are the following: The fixed wealth of the United States in 1916 was about \$260,000,000,000, whereof about \$30,000,000,000 was



in stocks of goods and all the rest in real estate, railways, etc. The population of the country was about 102,500,000 souls, of whom about 41,000,000, men and women, were workers, about 14,000,000 of them being farmers. The total national produce was about 1,200,000,000 tons of goods, worth about \$45,000,000,000 to \$50,000,000,000. Out of that produce a group aggregating a little more than 400,000, who received incomes in excess of \$3,000 and paid income taxes, got about \$7,900,000,000. Less than one-half of that was derived from investments and more than one-half came from the personal efforts of this class. Persons enjoying incomes of less than \$3,000 received about 44 per cent of the dividends paid by corporations and a much larger proportion, perhaps 75 per cent of the government, state, municipal and corporate interest payments. There remained from \$23,000,000,000 to \$28,000,000,000 to be divided among 27,000,000 non-agricultural workers, who received an average of somewhere between \$855 and \$1,040 each. Among the great classes of workers there is a wide difference in earnings. The farm hand in 1916 averaged about \$400, the factory worker \$675, the steam railway man \$886, and the metal miner \$1,250. Some classes probably averaged higher wages than the metal miner.

The purely capitalistic return, that is, profits, interest and rent, upon the wealth of the country cannot be determined, but apparently is only a small percentage, certainly less than 5 per cent. If the non-agricultural wage earners in 1916 could have appropriated all the income of the class of people receiving more than \$3,000 they would have added less than \$300 to each of their own incomes, but in fact they could have done no such thing, for the large sum ascribable to the personal efforts of business and professional men would not have been available for division.

Since 1916 the population of the United States has been increasing at the rate of about 1,700,000 per annum, but the aggregate production of goods has increased scarcely any. Out of the substantially stationary production, much has been wasted in warfare and much has had to be supplied to the people of Europe. The quantity available per person in this country has therefore diminished. The talk about labor henceforth participating to a greater extent in the produce of industry is mostly nonsense, for labor already gets all that may be divided, and the only way it can get any more is to produce more. When labor thinks that it is getting more of the produce of industry by extortionate strikes, as a whole it is doing no such thing. The quantity of goods consumed by the 400,000 income-

tax payers is relatively insignificant. What really happens is that one class of labor, in order selfishly to satisfy itself, diminishes the ability of other classes of labor to obtain their needful share of goods. Manifestly conditions that enable some wage earners to bid shoes up to \$12 per pair do not greatly trouble people in the tax-paying class, but do prevent many other wage earners from having any shoes at all, or else having them at the expense of something else.

Amid the idealism of the day in the preaching of industrial democracy and the uplifting of the downtrodden these conclusions may appear cold and sterile, but they are not. If people can get into their heads the idea of the division of goods instead of the division of dollars they may become less extravagant in the use of goods and more fruitful in the production of them. The evils of the time and their corrective are condensed in this simple formula.

After Mr. Ingalls had read a number of paragraphs from his extremely interesting paper, the Chairman, Mr. Ball, announced that the subject was open for general discussion.

**Mr. Knox.**—I should like to ask Mr. Ingalls whether these figures respecting wages and numbers of men employed are founded on shifts per annum or on the numbers on payrolls. In some occupations there would be little difference between them, but in others there would be a very important difference, as, for example in the coal mines, where the average working year has been very often as low as 160 or 150 days per annum. Would Mr. Ingalls tell us upon what he bases the figures that he has used?

**Mr. Ingalls.**—As far as those figures go they are based on time actually worked. In some industries, probably in most of our industries, the unemployment is not as great as is commonly thought. In this paper I have some figures on just that subject, but speaking from recollection, among factory workers the difference between maximum and minimum is something like the difference between ninety and a hundred. There are some industries where quite different conditions exist and perhaps the most striking example of this, outside of those industries where the occupation is purely seasonal, is in the coal mining industry. In this industry year after year the time of men employed varied between a maximum of about 240 days and a minimum of about 200 days for the entire year. There is manifestly something wrong with the organization of a great industry which produces such a result, but, repeating my answer to your question, so far as we have been able to go

in these figures, the quotients are arrived at from the total amount in wages divided by the total number of men who work.

**The Chairman.**—We have with us this evening Mr. T. J. Jones, whom you all know as one of the big three who put the Kyshtim mines on the map. Mr. Jones has just returned from Russia and I am sure he can give us some very interesting information respecting production, as it has been effected through the slowing down of labor in that country.

**Mr. Jones.**—I happened to go out to the Kyshtim mines just after the revolution in March, 1917, and the management was soon waited upon by the Committee of Soldiers' and Workmen's Delegates who demanded increased wages and decreased bonus for the workmen. At first it was in a mild way; they were then under the control of the Kerensky Government and their intentions were apparently all right. They had just escaped, as they thought, from a terrible government and were going to have a government of their own and it was a case of live and let live for everybody. They had their hearts full of good feeling for the management and everybody seemed to be pleasantly disposed in every direction.

We met their terms because we were in touch with the government in Petrograd, which was the Kerensky government. We were supplying munitions for the government to carry on the war, and we were told that it would be quite in line with their policy to see that the workmen got more wages to offset which we would be paid higher prices for our product. We increased wages, the stipulation being that the production was to remain as it was. At that time we were producing about a thousand tons of copper a month and the wages were normal. Workmen were receiving according to American standards low wages; that is to say, the average was something like a rouble to two roubles a day. Piece work was allowed, as was also contract work. After a while this was objected to, and we were told that there should not be any contract work, there should not be any competition between the workmen themselves and we would have to stop all piece work. We did so, and they then made further demands for increase of wages and decrease of hours until finally the time for work reached six hours per day. All this time I kept curves of the production and the hours and wages, etc., just to see how it was going on, and it was very interesting to note the results.

In two months our production had fallen from 1,000 tons to about 350 tons per month and the cash payroll had increased



from 600,000 roubles to 2,000,000 roubles per month and we had no more money to meet the payroll. We had to borrow money. The Kerensky government very kindly advanced us the money from time to time until it broke down. Our great desire from this time was to shut down, something that it was very difficult to do because the technical staff and the management was all there and now the workmen had become threatening and were disposed, as they said, not to leave one stone of the plant stand on another. Finally, we had to resort to strategy to shut the plant down. Of course, all of our mail was censored by the Workmen's and Soldiers' Committee, but we got word to Petrograd by some means or other suggesting that the money be shut off and the money stopped coming. At first we had a monthly payday, then it was reduced to two weeks, then we had to pay them every week. The payroll could not be made up accurately every week but it was estimated for it had to be got out, they simply had to have their money every week. Finally when the money stopped coming from Petrograd some of us made it an excuse to get out. We were under the coercion of the Committees. They said we were to direct the business and we were to stay on the job. They were not going to do us any harm or interfere with our daily life in any way, but it would not be advisable for us to take any side trips. We made use of the lack of money coming from Petrograd, as an excuse for a journey to that city to see what became of the money. Of course, it was done in their behalf, but we did not go back.

This illustrates the course of events at Kyshtim. Events took place more rapidly than similar events appear to be taking place in this country, but as far as I can see the tendency is in the same direction. I do not believe it is going to get as far as it did there. I do not believe this country is going to be Bolshevik. It can not be so as long as there are such a large number of conservative people who have a stake in the country. The trouble in Russia was that the number of people who had anything at stake was small. The intelligent class was but a small percentage of the population, not only that but the intelligent were not a militant population. In America you have a class of people who are intelligent and they are willing to back their ideas and fight for their principles. In Russia unfortunately that was not the case. If the "intelligencia" had shown a disposition to fight this thing, it might have been controlled, but at the critical time they did not do so and later they were disarmed and unable to do it, because the first thing the Bolsheviks did was to gather all the arms

they could find and render the intelligent population defenseless and helpless.

In regard to the political situation in Russia, I do not know that I can say much that will be of any use. I have been asked what I think of Admiral Kolchak and what I think of his government. I may say that I spent the summer in Omsk and saw the workings of the government. My impression is just that of the ordinary business man who has been living in the town. The news in the papers is entirely unreliable. It is censored by the government and nobody is at liberty to speak freely. You only hear underground rumors and you have to weigh the source from which you get your information and make your judgment accordingly. There is a great deal said about Admiral Kolchak that is derogatory, and his methods are said to be even worse than those of the Bolsheviks, but with such statements I cannot agree at all. I think Admiral Kolchak and his government are lacking in a great many things. He lacks equipment and his ministers are men of very little experience. The best men in the country, the statesmen, the people who understood government and understood the ways of doing things under the old government regime had to leave the country. They are now in Paris and the men whom Kolchak has with him are inexperienced. They are getting along the best way they can, but they have a great deal to contend with.

I am sure Admiral Kolchak is a patriot and that his principles are sound and the most unfortunate thing that has happened was that the Allies did not carry out the promises that they made to him when he assumed the government. When he took charge of the government of Siberia he was promised that his government would promptly be recognized and that assistance would be given. A definite promise was made that they should have the support of the Allies, not only recognition, but that they should have material aid. They were to have munitions of war, and they were to have soldiers who would go to the front and stiffen their own men and show them how to fight. This was done in some instances, but when it came to a substantial test of the matter, it happened that the Allies did not send what was promised. The word had passed through England and America largely through labor propaganda that the Allies were not to render aid and their soldiers were withdrawn and the promises were not carried out. The British did send some soldiers who were to fight; that is, they raised what they called Anglo-Russian regiments in which there were some British officers and some British sergeants,

but they never reached the front because demands were made by the labor body of England that this should all stop and it was stopped. It actually worked more harm than good since their going that far and not going further, hurt the spirit of the Russians. It destroyed the confidence of the Siberian soldiers themselves and there was disorganization going on when there should have been organization. It gave them the idea that they were not going to receive any further assistance from the Allies.

America and the Allies have done one splendid bit of work in opening and protecting the Siberian Railway; that is something about which I have not heard in this country, but it is something which should be heard of. Mr. Stevens' commission did a perfectly marvelous work in opening up that Siberian Railway, getting the track in order and getting it into operation. He rebuilt bridges. He put the rolling stock in order. He got the trains running on schedule time and provided facilities for transportation, not only for the people but for goods. He relieved the country at a time when it was in terrible distress. This commission really saved hundreds of thousands of lives from the mere fact of getting food from place to place, to say nothing of clothes and comforts. This is certainly something America can be proud of—the Stevens Commission and the men on it. They were military men but they were also men who had had previous railroad experience in America. They took charge of this work and got the road open and got it in operation and I was proud to be an American when I saw what the Americans were doing. They did not speak the language, they did not know the customs and the manner of living, and they were suffering all kinds of personal inconveniences, but I did not hear one of them complain. They knew they were doing a good work and they were satisfied with the reward which that kind of work brings in itself. Some day it will be explained to the American people what the engineering profession contributed to the help of Siberia and Russia. There is still a big work to do there, there is an enormous philanthropic work to do in that country. It needs help.

There is one thing I have noticed in this country, a lack of understanding as to Russia's part in the early stages of the war. We must remember that in the early days of the war Russia saved the situation. In the defeat that was suffered at Tannenberg they sacrificed the lives of 300,000 of their men in order that Calais and Paris should be saved. They drew to their front hundreds of thousands of German soldiers who would undoubtedly have gone to Calais or Paris had they not



been sent to the Eastern front. A year later when General Brusiloff made his advance across the Carpathians he took, in six weeks, 300,000 prisoners. In all the history of the war nothing was done like that by any other army and such things should not be forgotten. There is a common belief that Russia very nearly ditched the war and caused the war's end to be delayed at least a year. That is true, but it must be remembered that this was done by a small minority of anarchists who happened to have the militant spirit and strength to take hold of the government. We should not hold this against the Russians. These anarchists were a minority, they are only about 8 per cent of the Russian people. The other 92 per cent are people like you and me and they have the same ideas respecting their right to live. They deserve the consideration of the rest of humanity and I think it is certain, in time, that something more should be done for Russia. I do not disparage the money America is spending in Armenia but I think Russia is a much more worthy country to spend it in. It is certainly worth spending some money in. I know my heart is in Russia because I have lived there so many years and I have been well treated in that country. Perhaps that is the reason why I speak with a considerable amount of feeling.

At the same time the facts and the figures and the history can not be denied and I think we should all look at Russia—the American people particularly—in a little more charitable light now in the time of their greatest distress. They have a chance to reorganize their country and they are going to succeed. But a danger still hangs over the country. If the Allies do not give her the assistance that she deserves, there stands our former enemy ready to help her, and the result will be that Russia and Siberia, incomparable fields for American enterprise and American industry, will fall into other hands and we will not derive the benefit that would be ours. That, of course, is a commercial way of looking at it, but still it is a strong argument.

**The Chairman.**—I think the idea of the thirty-hour week originated in Australia. Mr. Gepp can perhaps tell us something of the non-productive ten hours and eighteen hours that have been given up in Australia, at least in certain of the industries.

**Mr. Gepp.**—Mr. Chairman and gentlemen: I do not know enough about the thirty-hour week to talk about it, but as far as the general position in Australia is concerned I think a great deal depends on the point of view. We have gone

through, somewhat earlier perhaps, what most countries have gone through. The conditions in Australia were much more suitable for the experiment than they were in this country, where 500,000 men are coming in to the labor market every year and it is possible we have kept the pot from boiling to a certain extent. Of course, we have a smaller country as far as numbers go, and consequently we could carry out experiments that would not upset things so much as it would in old countries like the British Isles or the United States where the numbers are so much greater. Further than that we have a homogeneous population.

As far as the labor position here is concerned, I recall that in 1915 and 1916 I heard people talking and they would say when complaining of conditions, "Gepp, what do you think about it?" I replied, "The only thing I can say about it is that it makes me feel just like home," and it seems to me, gentlemen, that if we are going to try to hold the present position that it is not so much a matter of wages as it is a matter of education. I do not mean so much the matter of education in the way of general reading, but it is the education of the employing class, the professional class and the working class. The average employer—and I can speak particularly, of course, of Australia and the British Isles—the average employer has not the remotest idea of the attitude or the minds of the workers. The employees have less idea of the attitude of the employers, and under those circumstances you will never get anything but discontent. The only possibility is for men to understand more of general economics just on the lines that Mr. Ingalls put to us to-night, and for the employer to show that he is human and become more human in his general attitude toward employees.

We have an example in Australia. We have one mining camp where we had all kinds of strikes. We have another mining camp 300 miles away where we have not had a strike for years, and that can only be accounted for by the difference in relations and difference in the attitude of the men, because conditions are almost the same. Legislation has developed in Australia to a very great extent. The unions are more responsible. They are mostly incorporated. We have Federal arbitration boards and we have straight arbitration boards and we have wage boards, but I believe in all those they have regarded money only. Referees have nearly always made decisions in terms of dollars. They have not realized and the employer has not realized that unless you put personal touch into your business—I do not care whether it is a big business of 200,000 employees or whether it is a small business of 500 employees—

unless you can get the feeling of fair play for both sides, you are not going to have anything like a reasonable solution. Now, that can be done. Many of the troubles in Australia have resulted from the awards of the courts or the interpretation of those awards. The men have felt that although they have obtained what they have fought for as far as the real wording of the award was concerned, the spirit behind it was one of "damn you" and "to hell with you." Now, you can not get decent work that way, you can not get efficiency. Under present conditions we shall never get good work until we get good will right throughout the whole job. Now, how are you going to do it?

You can only do it in my opinion on a big scale by starting right out in the schools and the colleges and the universities and teaching the whole general question of psychology, of mental science and of the relations between man and man, so that all the younger fellows who are going out into the world and are finally going to be the foremen, superintendents and managers will be of the view that after all it is the happiness and the contentment of the community they have to fight for rather than money. We have, I think, in a small way tested this out, and I think as far as it has gone it has proved to be the right line. Talking particularly of Australia, which is to a very great extent just about the opposite of England, I can only say this, that when you get in touch with your men and take them into your confidence, and give them an interest in their work, just the same as the men in England had an interest in their work during the war and did an enormous amount of work, so you will get better work and better effect, not only with the men but with the boss, who will not be worried as he is at the present time about labor troubles.

As an illustration of the failure to bring the management in touch with the day laborer, they tell a story in England of a man who was the general manager of a railway company. He had been eighteen years in the service and he was retiring and the men in the service wanted to give him a present. He told them that he did not want a present, but would like all the men who had been in the service as long or longer than he had been to have recognition. They went out to look these old hands up and one of the men came back and said he had found one interesting case—a man nineteen years on the job, who had been on one job all the time and had never had a black mark against him, nor had he ever had a rise in pay. The general manager requested that this interesting individual be



brought in. In due course he was brought in and the manager said to him:

"You have been in the job nineteen years?"

"Yes, sir."

"You have been in the job nineteen years and you haven't had a rise in pay?"

"No, sir."

"And you haven't had a black mark against you?"

"No, sir, not for nineteen years."

"What have you been doing?"

"I have been tapping the wheels of the express train that goes through Southampton station."

"Have you been doing this for nineteen years?"

"Yes."

"Why were you doing this?"

"I'm damned if I know."

Now, if we can get that attitude out of the man, and can get a spirit of co-operation that I believe can be obtained—it is more difficult when the men do not speak the language of the country, but it can be done by propaganda of which the war showed the value—then there is a chance of getting decent work and there is a chance of getting more output per man and then there is a chance of getting shorter hours and general content. It does not matter what hours we work, it is what we do in the hours we work, and we have tried it. With certain men who have the ideals that we have we are trying the thing out. One thing we have tried is to avoid patronage in everything. That is, I think, the main thing, but another thing is that you must take the men into your confidence. Without giving them a right to dictate you must give them an interest in the work as to why it is being done and how, and with intelligent men we do get results.

The conditions in Australia are by no means ideal. The change is coming, though, and it is coming through the men who are coming back from the front. Two hundred and fifty thousand men have come back from the front and the change in my opinion is coming. Perhaps in our little way, with less to risk in those things, we may be able to show a few points in that direction, but we are doing it only after very careful consideration and not by relying on all old stock but by grafting new men on this stock. If there are any questions as to the lines we are working on, I should be very glad to answer you, but I think Mr. Rigg can give you more of the story than I can.

**The Chairman.**—Are there any questions that you would like to ask Mr. Gepp or Mr. Rigg?

**Mr. Hughes.**—Do you think that the work that Henry Ford is doing in this country is in any way comparable with what has been outlined to us as a desirable thing to do?

**Mr. Gepp.**—I am not very well acquainted with Mr. Ford's work and I should say that the general spirit of it is; that is to say, he is dividing his profits, he is taking a definite interest in the lives of the men, of all employees. How far he is doing it by patronage and how far patronage has got to be brought in where I suppose the general intelligence of labor is lower, I do not know—one can only speak of what one knows. But we have no trouble. What works there might not work here. It seems to me the biggest thing America has to do is to get busy on Americanization. That is the big thing.

The meeting adjourned at 10.20 p. m.

## MEETING OF THE SOCIETY. PRESENTATION OF GOLD MEDAL.

November 24, 1919.

The Gold Medal of the Mining and Metallurgical Society was presented to Charles Eugène Schneider, Sc.D., E.D., on November 24, 1919, in New York. On the occasion of this presentation a testimonial dinner was given to Mr. Schneider at the Biltmore Hotel. The guests of the Society at this dinner were:

M. J. Casenave, Minister Plenipotentiary, Director General of the French Services; Gaston Liebert, Consul General for France, representing the French Ambassador; Baron du Marais, Vice-chairman the French Economic Mission, Financial Director, Credit Lyonnais; Benedict Crowell, Assistant Secretary of War, representing the Secretary of War; Emile Collin, representative in the United States of Schneider et Cie, member French Economic Mission; Aime Dumaine, member of Schneider et Cie; Herbert Hoover; Fayette S. Curtis, President American Society of Civil Engineers; Dean M. E. Cooley, President American Society of Mechanical Engineers; Calvert Townley, President American Institute of Electrical Engineers; E. H. Gary, President American Iron and Steel Institute; Dr. Charles Warren Hunt, Secretary, American Society of Civil Engineers; Bradley Stoughton, Secretary American Institute of Mining and Metallurgical Engineers; Calvin W. Rice, Secre-



CHARLES EUGÈNE SCHNEIDER





tary American Society of Mechanical Engineers; F. L. Hutchinson, Secretary American Institute of Electrical Engineers; and James T. McCleary, Secretary American Iron and Steel Institute.

Upon invitation of the Mining and Metallurgical Society, the following societies joined in the tribute to Dr. Schneider through the attendance in a body of their presidents, secretaries and boards of directors: The American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers.

About 275 members and guests attended the presentation which proved to be one of the most enjoyable and satisfactory functions ever given by the Society. That it was such a success is largely to be credited to about fifty members who contributed most generously to the expenses of the dinner committee, but beyond all it was due to the untiring efforts of the chairman of the Committee, Mr. Stoughton, ably assisted by the Committee's secretary, Mr. Liddell.

The President of the Society, H. H. Knox, occupied the chair and successively introduced the following speakers: Bradley Stoughton, Dr. H. M. Howe, Dr. Charles M. Schwab, Brigadier-General Manus McCloskey, U. S. A., and Dr. Charles Eugène Schneider. Mr. Knox introduced Mr. Stoughton with the following words:

**Mr. Knox.**—When the annual gold medal of the M. M. S. A. was founded in 1914 it was sought to make the choice express the will of the full membership through the co-operation of the members, an advisory committee and the Council. Thus we feel that the members now absent have also played their part on this occasion. No one is so well qualified to set forth the purposes of the award than a member of the advisory committee who is also the Chairman of the Committee on Presentation, our fellow member, Mr. Bradley Stoughton.

**Mr. Stoughton.**—Mr. President, Mr. Schneider, and gentlemen: I am to have the pleasant duty of speaking to you upon the Gold Medal of the Mining and Metallurgical Society of America, and the special reasons why it was bestowed upon the eminent colleague in whose honor we have assembled this evening.

You have before you a facsimile of the Medal. It bears on the obverse side a female figure holding aloft a miner's light and she has broken a path through the solid rock, which here typifies ignorance. The artist thus expresses the ideal of pro-

gress in the field of mining or metallurgy, under the inspiration of the immortal Sophia, or Truth, or Science.

To digress a moment: The question has been asked this evening whether this beautiful woman is supposed to be a mining engineer. Now, there are several reasons why the ideal of mining might be symbolized as a female figure. For it is indeed a fact that some women have shown extraordinary ability in winning metal from the ground. Whether this be due to an inherent feminine instinct that enables her to locate precious hoard even in the pockets of Nature itself, or whether she, being feminine, is the more capable of coping with the geological faults of Mother Earth, you must get some one to tell you who admits that he understands women. And there is another reason why we think woman is an appropriate presiding genius for our medal. The first of these medals conferred, more than six years ago, on Mr. and Mrs. Herbert Hoover for their translation of a book on mining written in slangy and partly-manufactured Latin of the 16th Century. This translation had been unsuccessfully attempted at least three times before, and was an achievement requiring a combination of profound knowledge of mining, rare intellectuality and devotion to the service of others which his colleagues recognized years before the name of Hoover became a title of honor in every civilized land.

The medal has also been awarded to a distinguished author and investigator in the art of milling; to a great geologist; to an eminent metallurgist; and to a second mining engineer of outstanding ability. You will be interested to know that all but one of these men are present this evening to pay honor to the first recipient outside the citizenship of the United States.

In the year 1919, the powers that be decreed that the medal should be awarded for conspicuous attainment in the manufacture of iron and steel. The committee appointed for the purpose was obliged, by the rules, to nominate two men. One was a prominent inventor and metallurgist of America, and the other was the great iron master of Europe. The selection was made by a ballot of all members of the Society.

Mr. President, a medal is of small intrinsic value even when pressed in purest gold, but you have before you evidence of its spiritual power, in that it has enabled us to gather here with distinguished colleagues from many parts of our great continent, besides honored guests from across the seas, and it gives us an opportunity to pay a heartfelt tribute to that land with inspiring history and modest, yet heroic men, inseparably linked to our hearts by ties of affection and admiration. I sub-



mit, Mr. President, whether our politicians are ready to act yet, or not, that the first friend of our Republic has become by the will of the American people, our ally forever.

And, finally, this medal, small in itself, yet expresses our great appreciation of genius in the domain of science, and of rare attainment in the practice of our profession.

**Mr. Knox.**—To acclaim the distinguished French metallurgist, I shall now call upon the dean of American ferrometallurgists, Dr. Henry M. Howe.

**Dr. Henry M. Howe.**—We rejoice in this opportunity of greeting Mr. Schneider as the medallist of this evening, as the illustrious scion of an illustrious stock, as the President of the Iron and Steel Institute, as the Honorary President of the Comite des Forges, as the bearer of numberless eminent distinctions and decorations from many countries, as the great leader, officially and unofficially, of the French iron industry, as the player of a glorious and indispensable part in the great victory, as the uplifter, brightener, and sweetener of the many hundreds of thousands of lives that come under his influence, but above all as a great Frenchman, as one of the foremost leaders of that wonderful people to whom we look not only for our inspiration in art and letters, in everything of beauty, but also for imperatively needed help in our coming struggles of defense against the Teuton.

While we are to hear from an illustrious orator about Mr. Schneider's work as an ironmaster, I am permitted to say that he controls about 250,000 workmen at Le Creusot and his many other steel works, shipyards, iron and coal mines, optical works, machine tool works, electrical works, Diesel engine works, locomotive works, bridge and other works; that he supplied about three-quarters of all the artillery used in the war by the French, including the Schneider 21-inch guns; that he supplied the American army with about half of its heavy artillery and all of its field artillery, besides sending much to the Belgian, Italian, Rumanian, Russian and Serbian armies, and supplying enormous quantities of the most varied war material such as aircraft, tanks, and machine guns. This achievement is not dimmed by our sending ordnance to Europe on a like scale. As early as March, 1915, foreseeing our eventual entry into the war, he sent engineers to introduce into this as well as other countries the French methods of making shell and gun steel, thus lightening the work of the French commissions later sent to buy munitions.

That he is as humane as he is otherwise great is shown by

his care not alone for the bodies but also for the character of his men. His schools for workmen, foremen, and engineers are models. He introduced a pension system as early as 1877, long before his government acted in this direction. Besides improving the material environment of his men he has striven vigorously and with brilliant success to develop a higher spirit of endeavor and a broader outlook on life.

The effects of such labors are not readily measured by yardsticks or dollars, but it is instructive that a very large proportion of his men own their homes and gardens.

Proud as France must be to have such a representative, so proud must you be, Sir, to represent such a country. Will you bear with me, friends, while I speak of France and our relations to her. As Mr. Schneider acted, so did France. The first German rush reduced the French production of pig iron by 81 per cent and of steel by 63 per cent. Yet in about two and one-half years France nearly tripled the number of her blast furnaces, and increased that of her open hearth furnaces by about 60 per cent. During the war she increased her annual production of rifles 290 fold, of machine guns 70 fold, of 155-cm. shells 225 fold, and of 75-cm. shells 15 fold, the production of these last reaching the enormous number of 200,000 a day. Far as these numbers are beyond our mental grasp, they suffice to correct the impression that it is by necessity that France has devoted herself to the exquisite perfection of her products rather than to their quantity. Her gigantic output of munitions, her supplying not only her own almost infinite needs but also ours and those of five other allied nations shows that, in habitually devoting herself most strikingly to products beyond the skill of all other people, she is following choice and not necessity.

Pleasant as it is to dwell thus on the virtues of our sister republic and of her illustrious countryman, we owe it to her and to ourselves to consider sternly the danger against which she is from geographical necessity our first line of defense. Our present victory only postpones further Teutonic aggression. That combination of treachery and predatoriness which has kept the world abroil since Caesar's days, persists and will persist to plague us and our descendants. It would be as base and fatuous now as in Patrick Henry's days to hug "the delusive phantom of hope," our hope that a nominally republican Germany has shed its inherent vices, for they spring not from any special form of government but from the nature of the people itself. It is rather the autocracy that springs from the

German vices, as the form which makes treachery and predatoriness most efficient.

Rather than be misled by our strength into false security let us face the weaknesses of the liberty, which we nevertheless adore, and the strength of autocracy, which we nevertheless abhor. Among these weaknesses are that our strong self-directing units neither cohere by habit as strongly nor organize as readily as the unthinking subjects of an autocracy; that immediate self-interest concentrates the attention of our leaders on re-election instead of on statecraft, and in particular leads them to conceal danger lest it disturb the electors and imperil re-election; that we insist on being convinced individually of the wisdom of a call to arms in aid of a threatened ally, who thus may be effaced by the autocratic enemy while we debate; that we shall always have the disadvantages of the defensive in a surprise attack; and that we are restrained by humanity while the autocrat is free to exterminate by means however foul. It is vermin that we must fight.

Shall we therefore say with the pessimist that it is in vain to resist; that in the struggle for existence organization must conquer disorganization and cohesion incohesion; that the Teuton lost this war only because he fought as the fool fights, by goading America into helping the other democracies; and that the first time he has a great leader he will succeed as thoroughly as he has just failed? A thousand times no. Democracy can prevail if it will have its dangers always in mind, and because of them will prepare for active and persistent inter-democratic co-operation. The League of Nations which we need is rather a League of Democracies to resist the perennial international brigand, than one including the just and the criminal, the peaceful and the predatory alike.

In our present attempt to establish international jurisprudence we have the essential conditions of the frontier, the immediate need of protecting the peaceful from the criminal. The history of the Germans shows that they are not only congenitally and incurably but avowedly criminal. Their fundamental principle that the state can do no wrong means only that they intend every possible international wrong and will simply call it right. They avow criminal intent. As well might the vigilance committee admit to its councils the outlaws whose outlawry is the reason for its existence.

In our relations with France, whose history and geography lead her to watch the German peril as no other country will, lie the most effective means of fitting ourselves for this inevitable conflict. Our intimacy and sympathy with her, our



understanding of her character, of her mode of thought and action, and of her necessary position as the watchman of democracy, should be so full that we shall both await her signals and respond promptly to them. It should be familiar to all of us that, as this country owes to France both its birth and its preservation during the years while we were slowly goaded into abandoning our inborn and inbred policy of isolation and joining our own defenders in the common defense of mankind against the Teuton, so we shall owe our survival of the coming Teutonic attacks to her vanship.

Mr. President, one need not be a financier to see that the debt already incurred cannot be measured in dollars nor extinguished by shipments of goods. The scholar among his books like the banker among his ledgers knows that France's adverse balance of today represents her expenditures in our defense as well as her own. If, remaining in safety, I arm my guard to defend me while risking his life, who should pay for the arms, he or I?

In order that France may act effectively to retard the next German onslaught she needs the complete control of the west bank of the Rhine. It is she that must be the "Watch on the Rhine." Whatever the claims of this region for self-determination in favor of the brigand, they are canceled by his brigandage. The tiger has no claim to retain the sharpness of his claws, God-given though it be.

**Mr. Knox.**—To greet the famous French iron master I am about to call on a great American iron master. So familiar is he to us in his American aspect that we at times overlook his bulk in European eyes. This was but recently expressed in one terse sentence by an English cabinet minister, Sir Eric Geddes. Said he, "If it depended on me I would create him a duke." Now, the fathers of the republic in their wisdom discouraged the acceptance of foreign titles by American citizens and for that reason, and for that reason alone, I am constrained to address him still as Dr. Schwab.

**Dr. Charles M. Schwab.**—Mr. President, distinguished guests and gentlemen: I felt utterly discouraged when I listened to that polished and learned address of our distinguished professor, and especially did I draw just a slight gleam of happiness in looking at the program and finding that there was no speaker after myself who might well be termed an orator.

The last time I spoke in Mr. Schneider's presence—I can't say Snédère—was at a meeting in Paris. I was asked by our dear friend, Albert Vickers, now deceased, to say something for

the benefit of our European friends on the question then being discussed, which I did as briefly as I could. Then I begged Mr. Vickers, who was familiar with the French, Italian and German languages, to please interpret for me what I had said in order that all might understand. So he arose and said that he had been requested to translate my remarks and that he would take great pleasure in doing so and his first interpretation of my speech would be in English.

I just told Mr. Schneider this evening that it is thirty-one years since I first visited his plant at Creusot. His father was then one of my best friends, as a younger man could have an older man for a friend. At the same time as my visit General Crozier, who is here this evening, also went in the interest of the United States Government, the same General Crozier to whom great honor is due for the development of our American ordnance. I visited other works in Europe, but it is a pleasure to take this opportunity of saying in America that the Creusot works were thrown open to us and that all the information and experience they had was placed at the disposition of their American friends for their guidance in the future.

We are very proud—I am very proud of Bethlehem. I think that the United States is proud of Bethlehem. France is proud of Creusot, the world is proud of Creusot, but as a worker of Bethlehem, Mr. Schneider, let me say to the master of Creusot that we do you honor and homage tonight and acknowledge that you have been our teacher and leader in the production of ordnance.

When I speak of this name Schneider I am reminded of a picture I saw a short time ago. I think it was published in *Life*. It showed the Kaiser seated on a chair and on his lap was a table on which was engrossed, "Shipbuilding, ordnance, shells and other program of Messrs. Schwab and Schneider," and the Crown Prince standing back of him said, "And what fine German names, too." They may have been fine German names, but I want to say, and the ladies will pardon me, that we gave them a hell of a run with ordnance that we turned out at Creusot and Bethlehem.

Mr. Schneider, our distinguished guest, we have a greater problem ahead of us than the forging of the great guns and howitzers that you forged and machined and made during this great war. Useful as these great ordnance works were, a greater problem still confronts you, and of all the great steel masters in the world qualified to cope with that problem I place you in the front rank. That problem is to forge the guns of public opinion and forge the howitzers of honest justice to

democracy and mankind by which the world shall be ruled and conquered in the future. No man is better qualified to do this than you. In spite of the honors that have come to you for the work that you have done of a material character, by reason of your youth, your vast experience and that which lies before you, I predict that greater honors will come to you, not only from the citizens of the United States and France, but from all the world at large, in the work that you are to do for humanity and justice and the benefit of mankind in the years to come. We are changing, surely changing, as you are, the great ordnance works into works of commerce and surely hammering the sword into the plowshare of business, and we will find in the doing of it greater recompense in satisfaction, if not in money, in producing that which will bring greater happiness to mankind. Money means little to you, Mr. Schneider. It means far more to me, because I think I know better how to spend it.

Mr. Schneider, we welcome you here to America. I am sorry that I have been absent on the Pacific Coast during the greater part of your visit. I think over our many pleasant meetings in France and I think of the prodigious work which you have accomplished for your country, the Allies and mankind. There is no word of greeting or no word of approval that I can utter to express to you how much we admire and appreciate all you have done and how welcome you are in our midst in America.

We hope that you may come back here, not as an official of a great committee, but for your own charming personality and self, in order that we may greet and talk to each other as steel worker to steel worker, as ship builder to ship builder; not as the man who has been recognized and decorated by all the societies and governments of the world, but for that which is dearer and more charming, your own good personality and your own gentlemanly self, and let us be Schneider and Schwab and France and America forever.

**Mr. Knox.**—If the world were asked to condense in a single phrase its conception of the French genius that phrase would be "supremacy in war and in the fine arts." It has often occurred to me that this idea is very perfectly expressed in the old guns that were sent over to America by Louis XVI to assist the colonies in their struggle for independence. Cast in bronze, richly ornamented with sculpture and engraving from breech to muzzle, they are at once weapons of war and works of art. In their infinite variety they have one feature in common. Above the royal arms of France a scroll bears the de-



vice, "*Ultima Ratio Regum*." The products of Creusot are no longer cast in bronze, they are no longer richly embellished, but still they are and probably for ages to come will be *ultima ratio regum*, the last argument of kings and of sovereign peoples.

The further development of this theme I will leave to one who is well versed in that form of logic that has so convincingly appealed to the Potsdam type of mind. He began his disputatious career in Cuba, thence to the Philippines, taught the Boxers in China, and continued to Soissons, to Chateau Thierry, Belleau Wood, the Argonne, and terminated his argument only at 11 o'clock on the 11th of November, 1918. Brigadier-General McCloskey, United States Artillery.

**Brigadier-General McCloskey.**—Dr. Howe and Dr. Schwab have told you of the genius of M. Schneider as a metallurgist and an ironmaster. It is my privilege to tell you how the fighting man used the product of the great Creusot Works, especially the 75-mm. guns.

In June 1917, I organized a regiment of light field artillery equipped with our American three-inch gun. We had at that time only 544 light field guns in the United States and they could not be manufactured fast enough to equip the large army that was planned. So it was decided to use our American three-inch guns at home for training and to use the French guns for combat in France.

On January 11, 1918, my regiment, without equipment, sailed from New York. We proceeded via England, to an American training camp in France close to Switzerland. Here we received our French field artillery equipment, the famous 75-mm. guns of which we had heard such wonderful tales.

French officers and American officers previously instructed by the French taught us how to use the material. The officers and men of the regiment were eager to get to the front and they realized that the sooner they became proficient in handling the new gun, the sooner would they get into action. So they worked hard. Every morning at seven o'clock firing began on the range.

This was a regular regiment, the 12th Field Artillery of the Second Division. It was made up of volunteers, men from all walks of life, college men and illiterate, millionaires' sons and paupers' sons, a son of an ex-President of the United States, a cousin of the living President and sons of other prominent men.

By the middle of March we were pronounced proficient

and we entrained for service with our division at the front. This part of the front was near Verdun, in a so-called quiet sector. Here, acres of barb-wire entanglement separated the hostile lines, the ground was a maze of well-constructed trenches, on the hillsides were cleverly built concrete lookouts, accessible only through tunnels and presenting as a target to the enemy only a small aperture through which the observer watched the enemy trenches and beyond.

Battalion and regimental commanders lived in concrete dug-outs or shelters ten or twenty feet underground, sometimes equipped with electric lights and open fire places. The gun crews lived in dugouts beside their guns and the guns were in gun pits with overhead and flank protection. The guns fired through an opening which, except when firing, was closed by a curtain made of chicken wire covered with grass, moss or twigs the same color as the surrounding ground.

After the Germans began to use gas, the guns of a battery were emplaced in pairs about 300 yards apart so that if the Germans located one emplacement and gassed it, the other two guns of the battery could return their fire. Telephone lines were attached to the side of open trenches to prevent being cut by shell fragments and to facilitate repairs.

This, in brief, describes what was called a "quiet" sector. To these sectors were sent the troops which had been worn out and suffered heavy losses in the fierce fighting on other fronts, or new troops for instruction. And here, within sight of the glorious Forts Vaux and Douaumont, we received our baptism of fire.

In the middle of May we were relieved from this sector and engaged in open warfare instruction well distant from the front. While marching to this region we passed near the town of Bar-Le-Duc. The next day at the noon halt I noticed a motorcycle driver eating his lunch by the side of the road and I asked him if the lunch issued was all right. He said, "Oh, yes, but when we passed Bar-Le-Duc, I got a can of that jam we used to hear about." And he held up a can marked "*Haricots Verts*." When I told him that meant string beans he looked disgusted and said, "Blank the French, why can't they write English anyhow."

While we were engaged in open warfare practice, the Germans began their drive toward Paris. The infantry and Marines of the 2nd Division went by truck, the artillery by rail and marching, to the vicinity of Chateau-Thierry. Here the German was opposed by only a thin line of worn-out French

infantry. Behind this line our infantry and Marines intrenched and we placed our batteries in position. The French fell back and the Germans came upon our lines.

For 72 hours the guns of my regiment kept up a constant fire, stopping only long enough to cool. Our line stood like a stone wall—the German advance was checked—Paris was saved!

It may be of interest to know how the guns fired where their fire was needed. With each company of infantry in the front line there was an artillery lieutenant and four or five runners. Telephone lines could not be maintained to the very front because they were cut by shell fire and conversations could be caught by the enemy's listening-in or ground sets. The runners would carry messages back to the nearest telephone, from which the messages were phoned to the guns. At night, rocket signals were used. When the infantry in the front line heard the enemy advancing to attack, they would send up the prescribed rocket signal. Each battery had a lookout on duty at the guns watching for rocket signals. When he saw a signal in his own sector, he pulled a wire which rattled empty cartridge cases in the men's dugouts and he fired one shot to burst in front of his infantry. The gun crews ran to their posts and fired the barrage called for. This barrage formed a curtain of bursting shells about 200 yards in front of the infantry. Each gun of a battery fired six shots per minute for three minutes, then four shots per minute for three minutes, then two shots per minute for two minutes, and then one shot. If the density of fire was not sufficient, other batteries re-inforced this barrage or it was repeated.

This was the fixed, or defensive barrage. The rolling, or creeping barrage was used to rake areas or to precede an infantry line. This use of artillery fire was a French idea and was first tried in the attacks near Verdun in 1916. The artillery fire and the infantry line advance simultaneously, the infantry following the barrage by 100 to 200 yards. In opening an attack the old practice was for the artillery to deliver a heavy fire on the enemy front-line trenches for three or five minutes. This gave heart to the infantry and at the appointed hour they went over the top. The rate of advance of the barrage was the rate of the infantry's advance. This ranged from 100 yards in two minutes on open, level terrain, to 100 yards in eight or ten minutes in wooded, difficult ground. Sometimes the infantry line would be held up by machine guns or obstacles and the barrage would go on until stopped and brought back to the infantry.



On one occasion the infantry got in front of their own barrage. This latter occurred near Amiens. A British infantry brigade was to attack a line of German trenches near Albert. It was a terribly dark, rainy night when the troops were led into position and posted for the assault. At the appointed hour, their artillery opened fire but the shells were bursting *behind* the infantry. An officer yelled, "My God, men, we're in front of our own barrage! Run for those German trenches!" And they ran. They took the trenches and the Germans in them, and their own barrage rolled harmlessly over them.

As the war progressed, it became evident that the single line of artillery fire was not sufficient protection to the assaulting infantry. An experienced machine gunner would fire his gun until the barrage almost reached him, would then take cover, and as soon as the barrage passed, would again operate his gun and possibly stop the infantry advance. To overcome this, the so-called classical barrage was developed. This gave a fire-swept zone 1000 yards in depth and was organized as follows:

Two hundred yards in front of the infantry line was a line of 75-mm. shell, bursting on the ground, 20 yards apart.

Three hundred yards in front of the infantry was a line of bursts in the air from the 75-mm. guns.

Four hundred yards in front was a heavy machine-gun barrage.

Five hundred yards in front was a line of percussion bursts from the 155-mm. (6-inch) howitzer.

Six hundred yards in front was a line of percussion bursts from the 155-mm. (or 6-inch) guns.

And 800 to 1000 yards in front were the shells of the 8-inch and 9.2-inch howitzers.

This gave a fire-swept zone in which there was a little shelter for hostile infantry or machine gunners. And while this was being delivered, every known enemy battery was subjected to a special fire of neutralization or destruction. Especially vulnerable targets, such as railroad junctions, engineer and ordnance depots and ammunition dumps were assigned to the railroad artillery.

You can imagine the thrills we felt when at the appointed time, thousands of guns opened fire, thousands of shells screeched through the air and tons of metal were poured upon the enemy. The air trembled and the sharp, rapid discharge of the 75's mingled with the deeper notes of the larger calibres made music which sounded heavenly to us and the reverse to the Boche.

Fire of this character was used in the Argonne Forest. The Germans had held this line for four years. They had barb-wire entanglements, deep trenches, concealed mines and concrete machine-gun positions. Trees which had been uprooted by shell fire and branches which had been shot off, were lashed together with barbed wire to form obstacles. And behind these obstacles the German machine gunners were sheltered and concealed.

You can picture for yourself the task of our infantry. And I should fail, indeed, if I did not mention their gallantry. They displayed a bravery almost to the point of rashness, a willingness which made no task too great, a spirit which knew not defeat. And it was this spirit which demoralized the Germans in the firing line and dismayed the generals in Berlin.

The 75's were used a great deal in what is called interdiction or prohibition fire. During the operations connected with the capture of Belleau Wood by the Marine Brigade, my regiment and a regiment of French artillery furnished the immediate artillery support of the Marines. Three or four times every hour during the night and the day a burst of 12 or 20 shots would be fired at the northern exits of Belleau Wood. With machine gun fire on the eastern and western edges of the wood and this artillery fire on the northern edge, the Germans in the wood were completely cut off. When captured, some of them stated that the artillery fire had been so effective they had not received food, ammunition or re-inforcements in four days.

Not all of our firing was with French material. During the big drive of July 18, near Soissons, we captured many 77 and 150-mm. cannon from the Germans. We turned these around in their emplacements and returned to the German his own gas and high explosive, much to the delight of the American soldier. Later, in the Argonne, I equipped the trench-mortar battery of the New York City Division with captured German howitzers and used them in the final drive beginning November 1.

In locating targets within the German lines we used airplanes, balloons, flash and sound-ranging devices and sometimes spies. The airplane service was especially hazardous because it was necessary to fly low in order to secure good photographs, and when flying low the aviators were particularly vulnerable to anti-aircraft and machine-gun fire. A study of the photographs would reveal gun emplacements, camps or other targets.

The balloonists were 800 to 1200 meters above the earth and maintained telephone communication with a nearby battery. Whenever troops or transport or a hostile battery exposed themselves, the balloonist would phone his battery and ten or twenty shots would be fired at the target. Many balloons were shot down, the balloonist using his parachute to escape. Whenever a balloonist saw an enemy aviator coming his way, he gave a signal and his balloon was rapidly hauled down. On one occasion the Germans used a neat trick. One airplane was followed by another with machine guns firing. The balloonist, thinking an American plane was pursuing a German, did not give a signal to be lowered. When the planes neared the balloon, both opened fire and destroyed it.

To detect enemy guns by their flashes, men were posted in positions from which they could observe the enemy terrain. Sometimes they were in well-constructed shelters, sometimes in cast-iron cylinders with slots, and sometimes on the ground or in trees without shelter. They had telephone communication with the nearest battery and when enemy guns fired, they located the flashes on a map and sent word to our guns where to fire.

The sound-ranging device was a development of this war and a valuable application of science to warfare. At different places on the front, receivers were placed, connected by wire to a central station. Here the vibrations from the different receivers were recorded and compared. By the use of delicate instruments and great skill, enemy batteries could be located with great accuracy. This was what we called "counter battery" work and was the function of the Corps Artillery. For this work, the 155-mm. howitzer, or short Schneider, was used. This howitzer had a maximum range of 11,000 meters and was extremely accurate and reliable. Its projectile weighed about 90 pounds.

This latter function of neutralizing or destroying enemy batteries was primarily the work of the Corps Artillery but sometimes the howitzers of the Divisional Artillery were used. The Divisional Artillery consisted of two regiments armed with the 75-mm. gun and one regiment armed with the 155-mm. howitzer or short Schneider. Each regiment had six batteries of four guns or four howitzers each. These 48 guns and 24 howitzers were all of Schneider make.

Before the armistice was signed, the French had delivered to the American Army in France 1828 75-mm. guns, 772 155-mm. howitzers, and 216 155-mm. guns. To use this artillery,



officers and men were being trained in France and in the United States. At one instruction camp in Kentucky there were 14,000 student officers learning Field Artillery. When war was declared there were less than 300 Field Artillery officers who had had one year or more of service (275). When the war ended, there were nearly 24,000 (23,967). In like manner, the enlisted strength of the Field Artillery grew from 5,000 to 439,000.

There is an old saying "Victory is on the side of the biggest artillery," and it certainly was true in this war. Never before had such great masses of artillery been assembled, never such huge projectiles nor such long ranges. And for these weapons which won our victories, we thank the metallurgist and the iron master.

**Mr. Knox.**—It is seldom indeed that an award of honor is so replete with manifold meaning as this. It is bestowed at once on the savant, ordnance maker and Frenchman, and moreover on the countryman of Elie de Beaumont, Daubrée and de Launay, of Callon, Haton de la Goupillière, Moissan, and a host of technologists, living and dead, to whom American engineers owe an everlasting debt.

Charles Eugène Schneider, by the advancement of the metallurgy of iron and steel and by the development of quick-firing ordnance which has been a conspicuous factor in the achievement of victory, you have placed our country under deep obligation. In recognition of your distinguished contributions to these arts of peace and war the Mining and Metallurgical Society of America awards you its gold medal.

**Dr. Charles Eugène Schneider.**—Mr. Chairman, and gentlemen: I will first thank the President and the members of the Mining and Metallurgical Society of America who presented me this medal and say that I receive it with great pleasure. It is an old saying that some of us are born great, that some achieve greatness and that some have greatness thrust upon them. If on account of my native modesty I am doubtful of my claim to a place in the first two of these categories, I am the more keenly alive to the fact that by your kind action today I may rightly claim to belong to the third.

I receive this medal with a great pleasure and especially because in honoring me I understand and I feel that you honor my country and that also you honor my fellow men, those workers and those engineers of my country who have been working and striving with me and who helped me to carry out our hope during this war.

I always like to refer to this co-operation. Even this trip that we have been making in America is due to our desire of co-operation. My colleagues of the French Mission and of the other European missions to America have come to see and meet our American friends and tell them what we have been doing during the war, what we are ready to do now, what we are already doing and what we are expecting to do in the future, and we think that all we have to do we should not do alone. We were coming here to show you and to tell you of our needs, to tell you how we thought that you could help us, how also we expected that we might happen to help you. Our main desire was to establish between all of us the most friendly co-operation for the work we have to carry out.

The aim of these economic missions is to establish these relations, especially on the financial side. You know that Europe is now passing through a very difficult period of financial settlements and, as we thought that it was the interest of the whole world, America as well as Europe, to settle the affairs of the world in the shortest time possible, we thought that the best way was to come to our friends to show them frankly the truth of the situation and to ask them to help us and work together to this common aim of our different countries.

This co-operation we think should not be limited to this period and not be limited to financial matters. At the present time no nation and no individual may work or live alone. Our countries and our public may properly be compared to beehives and ant-hills in which every individual, every little beast or every human being has to work and struggle with the help of the others and for the sake and betterment of the life of the others. This co-operation has been our strength during the war, because I think that the victory is only due to the co-operation of the different armies. Of course, this co-operation of different individuals or different groups does not mean that direction is not to be given to the whole thing. We all understand that in the army, as during the war, the united direction or command was given to one man and to this was greatly due the victory of our armies. We also understand that in our concerns, in our works, direction by one man is equally necessary, but it is always more efficient when, as we try to do in our countries in Europe and as I was glad to see that you do here and I was also glad to see that my old friend Schwab always tried to do in his works, this work in this direction is always understood as a friendly co-operation too.

Of course, in this collaboration and co-operation of countries and of peoples in the future some may think that there

may be difficulty. They say that between different peoples or races there may come some difficulties by competition, by jealousy, by rivalry, and that it is very difficult to have men of different countries or of different races work together and keep the same aims. I do not think this is quite true. Certainly some people will find some difficulties, but I should rather expect to find, on the contrary, that things are quite easy. As we are among business men and iron masters I may compare this question to a metallurgical question, and I may say that when we try to mix iron and nickel, we might expect to get steel and a very hard and practical steel. But this does not happen. On the other hand when we mix iron with carbon, which is not a metal, and which seems at first to be quite different from iron, we can get the best of all steel, the hardest steel. If with these metals and non-metals we may by mixing them get strong alloys, I do not see why we should not in mixing the minds and mentality of men of different races, come to a similar result.

Is it not true that we find in this country, in America, the best example of what I affirm? If we go back to the early years of the youth of your country we see that a great many of you have come from European countries and that almost all American citizens can now find the origin of their families in foreign countries, often in European countries. Many came from Britain, many came from France, and I am glad to say that if my name and the name of my friend Schwab may sound at first as German names, it may be because the origin of my family is to be found in Lorraine and that of Schwab's family may be found in Alsace.

If the greatest number of the American citizens have their origin in Europe, and many of the great men in this country are of European origin, that does not mean that all the brains of Europe have been drawn to this country. We have a few good and very strong brains left in our country and that is the reason why we are very glad and proud to bring these brains over here to ask you to bring your very strong and powerful brains overseas, and on both sides of the ocean to try our best and mingle our efforts for the betterment of life and of everything in the world.

I know that this is the aim of many of the great citizens of this country and I know that my colleague, Mr. Schwab, has always understood that his duty was not only to turn out shells or bars or plates or armor plates or guns, but that it was also his duty to make something greater than these. He has made men, and when we notice how frequently he tries to be with



the men who work with him, we understand that the man who among his collaborators is known as "Charlie" is really the man that can direct other men and lead them on the right way.

Gentlemen, I will not detain you too long. I was glad to say these few words about our co-operation in the future, because I believe that if steel is the basis of all industries and the material basis of every kind of work in the future, I think that co-operation is also the basis of our understandings, of our common work and mutual relations in the future. I am glad to see present at this dinner many of the greatest citizens of this country, belonging as well to the army as to the different kinds of industry. Many of the presidents and heads of the different metallurgical societies and mechanical societies are my own friends and some of them, as you have heard, I have known about thirty years. I must only say that I very much regret that some of my very good and old friends could not be present at this dinner given by the Mining and Metallurgical Society of America. I would like to mention that I deeply regret that our friend, Mr. Spilsbury, who last year came to France and was kind enough to tell me on behalf of your Society that this medal would be awarded me—I very much regret that his duties kept him from being present at this dinner.

Gentlemen, I thank you again very much for your kindness. I will take back this gold medal to my country. I was sent by my government to bring as much gold as I could from the United States. I may say that I am going to bring some gold at any rate and I think it is the best.

I thank you again and I will say that I accept this medal as a token of your friendship and as a new and everlasting proof of the new ties that have been created between us, between all of us on both sides of the ocean, ties that will help us in the future to do what we and our allies must do. In the future we must be the leaders of the world to keep it from a repetition of the horrible period through which we have gone and following which we hope that peace, a very long and possibly an everlasting peace, will succeed.

**Mr. Knox.**—In conclusion of the ceremonies it only remains for me in behalf of the Mining and Metallurgical Society of America to thank those distinguished guests who have assisted us in this tribute to the medallist of 1919.

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| J. PARKE CHANNING.....1910-1912 | W. R. INGALLS.....1915 |
| HENRY M. CHANCE.....1913        | J. R. FINLAY.....1916  |
| W. R. INGALLS.....1917-1918     |                        |

## FORMER SECRETARIES

|                            |                             |
|----------------------------|-----------------------------|
| J. R. FINLAY.....1908-1909 | W. R. INGALLS.....1911-1914 |
| HENRY S. MUNROE.....1910   | F. F. SHARPLESS.....1915    |
| LOUIS D. HUNTOON .....     | 1916-1919                   |

## GOLD MEDAL

|                               |                      |
|-------------------------------|----------------------|
| 1914 { HERBERT C. HOOVER      | 1916 JAMES F. KEMP   |
| LOU HENRY HOOVER              | 1917 E. P. MATHEWSON |
| 1915 ROBERT H. RICHARDS       | 1918 POPE YEATMAN    |
| 1919 CHARLES EUGENE SCHNEIDER |                      |





# Mining and Metallurgical Society *of America*



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COMMITTEES

April 1, 1920

115 Broadway, New York

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*Executive Committee*, MESSRS. W. LINDGREN, W. Y. WESTERVELT, F. F. SHARPLESS, W. R. INGALLS and H. H. KNOX.

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At large, ex-officio.

Waldemar Lindgren, Cambridge.....Retires January, 1921  
W. Y. Westervelt, New York.....Retires January, 1921  
F. F. Sharpless, New York.....Retires January, 1921

Districts 1-2-3-4.

H. H. Knox, New York.....Retires January, 1923  
W. R. Ingalls, New York.....Retires January, 1922  
J. V. N. Dorr, New York.....Retires January, 1921  
Pope Yeatman, New York.....Retires January, 1921

District 5—Pennsylvania.

R. A. F. Penrose, Jr., Philadelphia.....Retires January, 1922

District 6—Ohio, West Virginia, Maryland, Virginia, North Carolina, District of Columbia, and New Jersey.

F. G. Cottrell, Washington, D. C.....Retires January, 1923

District 7—Minnesota, Wisconsin, Michigan, Iowa, Missouri, Arkansas, and Kansas.

H. V. Winchell, Minneapolis.....Retires January, 1923

District 8—Colorado, Utah, and South Dakota.

R. C. Gemmell, Salt Lake City, Utah.....Retires January, 1921

Districts 9-10—Northern California, Nevada, and Alaska.

Albert Burch, San Francisco, Calif.....Retires January, 1923  
F. W. Bradley, San Francisco, Calif.....Retires January, 1921

District 11—Southern California, Arizona, and Texas.

Ralph Arnold, Los Angeles, Calif. ....Retires January, 1922

District 12—Washington, Idaho, Oregon, Montana, and Western Canada.

C. W. Goodale, Butte, Mont.....Retires January, 1922

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**Metallurgical Engineer.**
- Adkinson, Henry M.....Walker Bank Bldg., Salt Lake City, Utah  
**Consulting Mining Engineer.**
- Aldridge, W. H. ....,.....50 E. 42nd St., New York  
**Mining and Metallurgical Engineer.**
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**Consulting Metallurgist.**
- Allen, A. W.....Rocky Mountain Club, 65 West 44th St., New York
- Alsdorf, F. C.....,.....396 South Stone Ave., Tucson, Ariz.  
**Mining Engineer.**
- Appleby, William R.....University of Minnesota, Minneapolis, Minn.  
Prof., Metallurgy; Dean, Minn. Sch. of Mines; Dir., State Mines Exp. Sta.
- Argall, George O.....,.....Iron Silver Mining Co., Leadville, Colo.  
**General Manager.**
- Argall, Philip.....,.....First National Bk. Bldg., Denver, Colo.  
**Consulting Mining and Metallurgical Engineer.**
- Arnold, Ralph.....,.....925 Union Oil Bldg., Los Angeles, Cal.  
**Consulting Geologist and Engineer.**
- Austin, L. S.....,.....1515 West 8th St., Los Angeles, Cal.  
**Consulting Metallurgist.**
- Bain, H. Foster.....,.....U. S. Bureau of Mines, Washington, D. C.  
**Assistant Director.**
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- Bancroft, Howland.....,.....Crocker Bldg., San Francisco, Cal.  
**Consulting Mining Geologist.**
- Barbour, Percy E.....,.....875 West 181st St., New York  
Mining Engineer; Asst. Secy., A. I. M. and M. E.
- Barker, E. E.....,.....Cerro de Pasco, Peru, Chile  
**Mine Superintendent.**
- Barringer, Daniel Moreau....,1242 R. E. Trust Bldg., Philadelphia, Pa.  
**Consulting Mining Engineer.**
- Bartholomew, G. P.....,.....Guggenheim Bros, 120 Broadway, New York  
**Mining Engineer.**



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Gen. Mgr., Chile Exploration Co.
- Berry, E. S.....Room 708, 111 Broadway, New York  
Consulting Mining Engineer.
- Bilharz, O. M.....Baxter Springs, Kan.  
Mining Engineer.
- Borcherdt, W. O.....Austinville, Va.  
Supt., The Bertha Mineral Co.
- Boise, Charles W.....Room 1100, 42 Broadway, New York
- Boutwell, John M.....National Copper Bank, Salt Lake City, Utah  
Mining Geologist.
- Boyd, W. Sprott.....Ray, Ariz.  
Supt. of Mines, Ray Consolidated Copper Co.
- Bradley, F. W.....Crocker Bldg., San Francisco, Cal.  
Pres., Bunker Hill & Sullivan M. & C. Co.
- Bradley, P. R.....Treadwell, Alaska  
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Dean, Faculty of Applied Science, Univ. of British Columbia.
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Geologist.
- Brown, R. Gilman..Pinners Hall, Austin Friars, London E. C. 2, Eng.  
Consulting Engineer.
- Browne, Ross E.....234 Perry St., Oakland, Cal.  
Mining Engineer.
- Browning, W. C.....Superior, Ariz.  
General Mgr., Magma Copper Co.
- Bruce, J. L.....Butte, Mont.  
Mgr. Davis-Daly Copper Co.
- Buck, Stuart M.....Bramwell, W. Va.  
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- Burbidge, Fredk.....725 Old National Bk. Bldg., Spokane, Wash.
- Burch, Albert.....Crocker Bldg., San Francisco, Cal.  
Consulting Engineer.
- Burger, C. C.....71 Broadway, New York  
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Gen. Mgr., United Eastern Mining Co.
- Burrall, Frederick P.....Dawson, Yukon Territory, Canada  
Mining Engineer.
- Butters, Charles.....6272 Chabot Rd., Oakland, Cal.  
Mining Engineer and Metallurgist.
- Canby, R. C.....334 South Main St., Wallingford, Conn  
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- Carpenter, Alvin B.....530 Citizens Nat. Bank Bldg., Los Angeles, Cal.  
Mining Engineer.
- Cates, Louis S.....Utah Copper Co., Salt Lake City, Utah  
Asst. General Mgr.
- Catlin, R. M.....Franklin, N. J.  
Eastern Mgr. of Mines, New Jersey Zinc Co.
- Chance, H. M.....839 Drexel Bldg., Philadelphia, Pa.  
Consulting Mining Engineer and Geologist.
- Channing, J. Parke.....61 Broadway, New York  
Consulting Mining Engineer.
- Chase, Charles A.....825 Cooper Bldg., Denver, Colo.  
Con. Mg. Engr.; Mgr., Liberty Bell Gold Mg. Co.
- Chase, March F.....c/o Leonard Const. Co., 6 Church St., New York  
Chemical Engineer.
- Church, J. A., Jr.....c/o Nichols Copper Co., 25 Broad St., New York  
Metallurgical Accountant, Nichols Copper Co.
- Claghorn, C. R.....584 Lexington Ave., New York
- Clark, C. D.....120 Broadway, New York  
Mining Engineer.
- Clements, J. M.....Bur. of For. & Dom. Commerce, Washington, D. C.  
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- Clevenger, G. H.....616 West 116th St., New York
- Cobb, Collier.....Univ. of North Carolina, Chapel Hill, N. C.  
Professor of Geology.
- Collins, George E.....414 Boston Bldg., Denver, Colo.  
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- Colvocoresses, G. M.....Humboldt, Ariz  
Gen. Mgr., Consolidated Arizona Smelting Co.
- Conner, Eli T.....434 Wyoming Ave., Scranton, Pa.  
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- Cornell, R. T.....Room 1424, 61 Broadway, New York  
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- Corning, C. R.....36 Wall St., New York  
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- Cottrell, F. G.....U. S. Bureau of Mines, Washington, D. C.  
Chief Metallurgist.

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- Cowles, Alfred H.....Sewaren, New Jersey  
Metallurgist; Pres., Elec. Smelting & Aluminum Co.
- Cox, W. Rowland.....120 Broadway, New York  
Mining Engineer.
- Crane, Clinton H.....61 Broadway, New York  
President, St. Joseph Lead Co.
- Crook, Welton J.....Stanford University, Cal.  
Metallurgist and Mining Engineer.
- Crowell, Benedict.War & Navy Bldg., 238 State St., Washington, D. C.  
Assistant Secretary of War.
- Darton, N. H.....U. S. Geological Survey, Washington, D. C.  
Geologist.
- Dawson, Eugene.....42 Broadway, New York  
Consulting Engineer.
- Deacon, R. W.....U. S. Metals Refining Co., Chrome, N. J.  
Superintendent, Chrome Plant.
- Derby, Charles C.....Box 459, Route B, San José, Cal.  
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- de Saulles, C. A. H.....120 Broadway, New York  
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- Devereux, W. B., Jr.....120 Broadway, New York  
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- Dorr, J. V. N.....101 Park Ave., New York  
Metallurgist; Pres., The Dorr Company, Engineers.
- Dorrance, Charles.....Jefferson Apartments, Scranton, Pa.  
Gen. Mgr., The Delaware & Hudson Co., Coal Dept.
- Douglas, J. S.....P. O. Box 1060, Douglas, Ariz.  
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- Douglas, Walter.....99 John St., New York  
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- Drake, Francis.Min. & Met. Club, London Wall Bldgs., London, Eng.
- Drew, Charles Verner.....15 Broad St., New York  
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- Drinker, H. S.....South Bethlehem, Pa.  
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- Drucker, A. E.....Wisconsin State Mining School, Platteville, Wis.  
Professor of Metallurgy.
- Drury, W. M.....A. S. & R. Co., El Paso, Texas  
Gen. Mgr., Mexican Mining Department.
- Dumble, E. T.....2003 Main St., Houston, Texas  
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- Duncan, M. M.....Ishpeming, Mich.  
Gen. Mgr. and Vice-Pres., Cleveland-Cliffs Iron Co.
- Dwight, A. S.....29 Broadway, New York  
Pres., Dwight & Lloyd Sintering Co., Inc.



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| Emery, A. B.....                                                         | Messina, Transvaal, South Africa<br>Mgr., Messina Transvaal Devel. Co., Ltd.                  |
| Fairchild, S. E., Jr. 6910 Wissahickon Ave., Mt. Airy, Philadelphia, Pa. | Pres., Cruse-Kemper Co., Ambler, Pa.                                                          |
| Farish, John B.....                                                      | P. O. Box 287, San Mateo, Cal.<br>Consulting Mining Engineer.                                 |
| Finch, J. W.....                                                         | 301 High St., Denver, Colo.<br>Consulting Mining Geologist and Engineer.                      |
| Finlay, J. R.....                                                        | 45 Cedar St., New York<br>Consulting Mining Engineer.                                         |
| Fitch, W.....                                                            | Eureka, Utah<br>Pres. and Gen. Mgr., Chief Cons. Mining Co.                                   |
| Foote, Arthur B.....                                                     | Grass Valley, Cal.<br>Supt., North Star Mines Co.                                             |
| Foote, A. D.....                                                         | Grass Valley, Cal.<br>Cons. Engr., North Star Mines Co.                                       |
| Fowler, S. S. ....                                                       | Riondel, B. C., Canada<br>Mining Engineer and Metallurgist.                                   |
| Fuller, John T.....                                                      | c/o American Bauxite Co., Bauxite, Ark.<br>Supt., American Bauxite Co.                        |
| Garlichs, Herman.....                                                    | 277 Gates Ave., Brooklyn, N. Y.<br>Consulting Metallurgist.                                   |
| Garrey, George H.....                                                    | 501 Bullitt Bldg., Philadelphia, Pa.<br>Consulting Mining Geologist and Engineer.             |
| Gemmell, R. C.....                                                       | Deseret Bank Bldg., Salt Lake City, Utah<br>General Manager, Utah Copper Co.                  |
| Gepp, H. W.....                                                          | Risdon Rd., Hobart, Tasmania<br>Gen. Mgr., Electrolytic Zinc Co. of Australasia Pty., Ltd.    |
| Godshall, L. D.....                                                      | 2892 Sunset Pl., Los Angeles, Cal.<br>Vice-Pres., Tecopa Cons. Mg. Co. and Ivanpah Copper Co. |
| Goodale, C. W.....                                                       | Butte, Mont.<br>Chairman, Bureau of Safety, Anaconda Copper Mg. Co.                           |
| Goodloe, Meade.....                                                      | 406 South Main St., Los Angeles, Cal.<br>Consulting Engineer.                                 |
| Gottsberger, B. Britton.....                                             | Miami, Ariz.<br>General Manager, Miami Copper Co.                                             |
| Graton, L. C.....                                                        | 3229 Idaho Ave. N. W., Washington, D. C.                                                      |
| Griffith, William.....                                                   | Coal Exchange Bldg., Scranton, Pa.<br>Mining Engineer and Geologist.                          |
| Guernsey, F. W.....                                                      | Thompson, Nev.<br>Mining Engineer.                                                            |
| Guess, H. A.....                                                         | A. S. & R. Co., 120 Broadway, New York<br>Managing Director, Mining Department.               |

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- Hanley, H. R.....410 Sharon Bldg., San Francisco, Cal.  
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- Hartranft, Samuel S. ....Norristown, Pa.  
Metallurgical Engineer.
- Hawkins, T. G., Jr.....Room 203, 347 Madison Ave., New York
- Heberlein, Kuno B.....61 Broadway, New York  
Mining Engineer.
- Hellmann, Fred.....Guggenheim Bros., 120 Broadway, New York  
Consulting Mining Engineer.
- Herron, D. A.....Telluride, Colo.  
Gen. Mgr., Tomboy Gold Mines Co., Ltd.
- Hersam, E. A.....University of California, Berkeley, Cal.  
Associate Professor of Metallurgy.
- Hill, Rowland F.....32 West 40th St., New York  
Mgr., Mg. and Met. Dept., General Chemical Co.
- Holden, Edwin C.....1100 Garrett Bldg., Baltimore, Md.  
Consulting Mining Engineer.
- Holland, L. F. S.....1718 La Brea Ave., Hollywood, Cal.  
Consulting Engineer.
- Honnold, W. L.....Room 2222, 120 Broadway, New York  
Consulting Mining Engineer.
- Hoover, Herbert C.....Room 2222, 120 Broadway, New York  
Consulting Mining Engineer.
- Howe, Ernest.....Litchfield, Conn.  
Consulting Geologist.
- Huntoon, Louis D.....115 Broadway, New York  
Consulting Mining Engineer.
- Hutchins, John Power.....Room 3700, 120 Broadway, New York  
Con. Engr., Am. In. Corp. of N. Y.
- Hutchinson, Edward S.....34 South State St., Newtown, Pa.  
Civil and Mining Engineer.
- Ingalls, W. R.....115 Broadway, New York  
Consulting Engineer.
- Jackling, D. C.....1800 Hobart Bldg., San Francisco, Cal.  
Vice-Pres., Utah Copper Co.
- Janeway, J. H.....160 Front St., New York  
Gen. Mgr., Ore and Fuel Dept., N. J. Zinc Co.
- Jones, James Ellwood.....Switchback, W. Va.  
Gen. Mgr., Pocahontas Fuel Co., Inc.
- Jopling, J. E.....321 Cedar St., Marquette, Mich.  
Chief Engineer, Cleveland-Cliffs Iron Co.
- Judson, Wilber.....14 Wall St., New York  
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|-----------------------|---------------------------------------------------|
| Keene, A. F.          | c/o Gold Fields Am. Dev. Co., 233 B'way, New York |
|                       | Mining Engineer.                                  |
| Keeney, Robert M.     | Colorado School of Mines, Golden, Colo.           |
|                       | Metallurgical Engineer.                           |
| Keith, Frank A.       | 1202 Hollingsworth Bldg., Los Angeles, Cal.       |
|                       | Consulting Mining Engineer.                       |
| Keller, Edward        | 365 West 56th St., New York                       |
|                       | Metallurgical Chemist.                            |
| Kelly, William        | Vulcan, Mich.                                     |
|                       | General Manager, Penn Iron Mining Co.             |
| Kemp, J. F.           | Columbia University, New York                     |
|                       | Geologist.                                        |
| Keyes, C. R.          | 944 Fifth St., Des Moines, Iowa                   |
|                       | Geologist.                                        |
| Kimball, E. B.        | 284 Mountain Ave., Piedmont, Cal.                 |
|                       | Mining Engineer.                                  |
| Kinzie, Robert A.     | First Nat. Bank Bldg., San Francisco, Cal.        |
|                       | Mining Engineer.                                  |
| Kirby, E. B.          | 253 West 95th St., New York                       |
|                       | Consulting Mining and Metallurgical Engineer.     |
| Kirchen, John G.      | Tonopah, Nev.                                     |
|                       | Gen. Mgr., Tonopah Extension Mining Co.           |
| Knox, H. H.           | 160 Broadway, New York                            |
|                       | Mining Engineer.                                  |
| Knox, Newton B.       | Minas de Phoenicia, Noya, Coruna, Spain           |
|                       | Consulting Engineer.                              |
| Lachmund, Oscar       | 1226 South Cedar St., Spokane, Wash.              |
|                       | Consulting Mining Engineer.                       |
| Laird, George A.      | Box 338, Bowling Green, Ky.                       |
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|                       | Consulting Engineer.                              |
| Lawall, Elmer H.      | Wilkes Barre, Pa.                                 |
|                       | Mining Engineer.                                  |
| Lawrence, Benjamin B. | 60 Wall St., New York                             |
|                       | Consulting Mining Engineer.                       |
| Lawton, Charles L.    | Hancock, Mich.                                    |
|                       | General Manager, Quincy Mining Co.                |
| Ledoux, A. R.         | 99 John St., New York                             |
|                       | Mining, Metallurgical and Chemical Expert.        |
| LeFevre, Solomon      | Forest Glen, Ulster Co., N. Y.                    |
|                       | Consulting Mining Engineer.                       |
| Leggett, Thomas H.    | 149 Broadway, New York                            |
|                       | Consulting Mining Engineer.                       |
| Lewis, J. Volney      | Rutgers College, New Brunswick, N. J.             |
|                       | Prof. of Geology and Mineralogy.                  |



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- Lindgren, W.....Mass. Inst. of Technology, Cambridge, Mass.  
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- Lindsley, Halstead.....65 Broadway, New York  
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Mining Engineer.
- Lloyd, R. L.....29 Broadway, New York  
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- Loring, W. J.....614 Crocker Bldg., San Francisco, Cal.  
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- Lyman, Benjamin Smith.....112 Elm Ave., Cheltenham, Pa.  
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- Lyon, D. A.....U. S. Bureau of Mines, Washington, D. C.  
Metallurgist.
- McClelland, J. F.....Liberty National Bank, 120 Broadway, New York
- McCreath, Andrew S.....236 Liberty St., Harrisburg, Pa.  
Consulting Chemist
- McDaniel, A. K.....700 Franklin St., Denver, Colo.  
Gen. Mgr., Greenback Mg. Co.
- McMeekin, Charles W.....1933 Cedar St., Berkeley, Cal.  
Mining Engineer.
- MacIennan, F. W.....Miami, Ariz.  
Assistant Manager, Miami Copper Co.
- MacNaughton, James.....Calumet, Mich.  
Vice-Pres. and Gen. Mgr., Calumet & Hecla Mining Co.
- Macnutt, C. H.....Black Lake, Prov. Quebec, Canada  
Mgr., Black Lake Asbestos & Chrome Co.
- Magnus, B.....320 Fifth Ave., New York  
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- Martin, O. C.....8424 116th St., Richmond Hill, L. I., N. Y.  
Works Mgr., Nichols Copper Co.
- Mather, Thomas Wm.....Oroya, Peru  
Asst. Gen. Mgr., Cerro de Pasco Copper Corporation, Peru.
- Mathewson, Edward Payson.....42 Broadway, New York  
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- Mayer, Lucius W.....42 Broadway, New York  
Consulting Mining Engineer.
- Mein, W. W.....43 Exchange Pl., New York  
Mining Engineer.
- Mead, Harry Lynwood.....Brewster, Polk Co., Fla.  
Mgr., Phosphate Mines for American Cyanamid Co.

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|--------------------------------------------------------------------|---------------------------------------------------|
| Meissner, Carl A.....                                              | 71 Broadway, New York                             |
| Chairman of Blast Furnace and Coke Coms., U. S. Steel Corporation. |                                                   |
| Melzer, Gustav Emil.....                                           | Mineral, Idaho via Home, Ore.                     |
| Consulting Mining Engineer and Metallurgist.                       |                                                   |
| Mercer, J. W.....                                                  | 15 Broad St., New York                            |
| Mine Manager.                                                      |                                                   |
| Merrill, Charles W.....                                            | 121 Second St., San Francisco, Cal.               |
| Consulting Metallurgical Engineer.                                 |                                                   |
| Metcalfe, G. W.....                                                | c/o U.S.S.R.&M.Co., 55 Congress St. Boston, Mass. |
| Mining Engineer.                                                   |                                                   |
| Mitke, Charles.....                                                | P. O. Box 2051, Bisbee, Ariz.                     |
| Consulting Mining Engineer.                                        |                                                   |
| Moore, Carl F.....                                                 | P. O. Box 385, Boston, Mass.                      |
| Consulting Engineer.                                               |                                                   |
| Moore, George.....                                                 | 28 Dock St., Yonkers, N. Y.                       |
| Mining Engineer.                                                   |                                                   |
| Moulton, H. G.....                                                 | 196 1/2 Treasury Bldg., Washington, D. C.         |
| Consulting Engineer.                                               |                                                   |
| Mudd, S. W.....                                                    | 1208 Hollingsworth Bldg., Los Angeles, Cal.       |
| Mining Engineer.                                                   |                                                   |
| Munro, C. H.....                                                   | 120 Broadway, New York                            |
| Mining Engineer.                                                   |                                                   |
| Nason, Frank L.....                                                | West Haven, Conn.                                 |
| Geologist and Mining Engineer.                                     |                                                   |
| Newcomb, C. Seymour.....                                           | 101 Park Ave., New York                           |
| Metallurgical Engineer.                                            |                                                   |
| Newsom, J. F.....                                                  | 913 Hobart Bldg., San Francisco, Cal.             |
| Mining Engineer.                                                   |                                                   |
| Notman, Arthur.....                                                | Bisbee, Ariz.                                     |
| Supt., Mine Dept., Copper Queen Branch, Phelps Dodge Corp.         |                                                   |
| Nichols, C. W.....                                                 | 25 Broad St., New York                            |
| Pres., Nichols Copper Co.; Gen. Mgr., General Chemical Co.         |                                                   |
| Oliver, Edwin Letts.....                                           | 503 Market St., San Francisco, Cal.               |
| Consulting Metallurgist; Mgr., Oliver Continuous Filter Co.        |                                                   |
| O'Neil, F. W.....                                                  | Ingersoll-Rand Co., 11 Broadway, New York         |
| Chief Engineer.                                                    |                                                   |
| Packard, George A.....                                             | 50 Congress St., Boston, Mass.                    |
| Mining Engineer and Metallurgist.                                  |                                                   |
| Parker, Richard A.....                                             | 802 Equitable Bldg., Denver, Colo.                |
| Consulting Mining Engineer.                                        |                                                   |
| Parsons, Floyd W.....                                              | 32 West 40th St., New York                        |
| Mining Engineer.                                                   |                                                   |
| Patterson, G. S.....                                               | Vivian, McDowell Co., W. Va.                      |
| Mining Engineer.                                                   |                                                   |
| Payne, Henry M.....                                                | Room 1870, 50 Church St., New York                |
| Consulting Mining Engineer.                                        |                                                   |

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|-------------------------------|----------------------------------------------------------------------------------------------|
| Peele, Robert.....            | Columbia University, New York<br>Professor of Mining.                                        |
| Penrose, R. A. F., Jr.....    | 460 Bullitt Bldg., Philadelphia, Pa.<br>Consulting Mining Geologist.                         |
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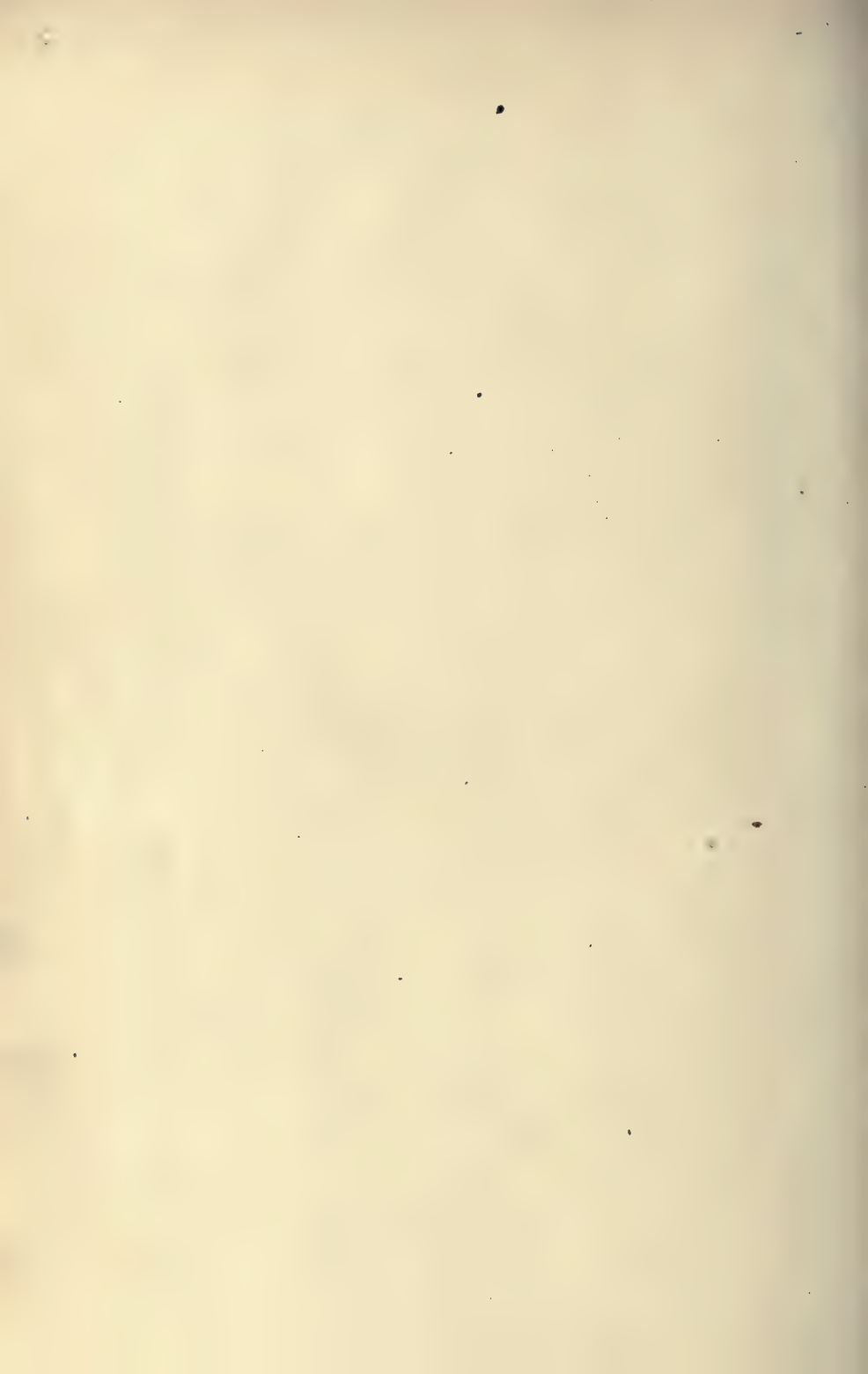
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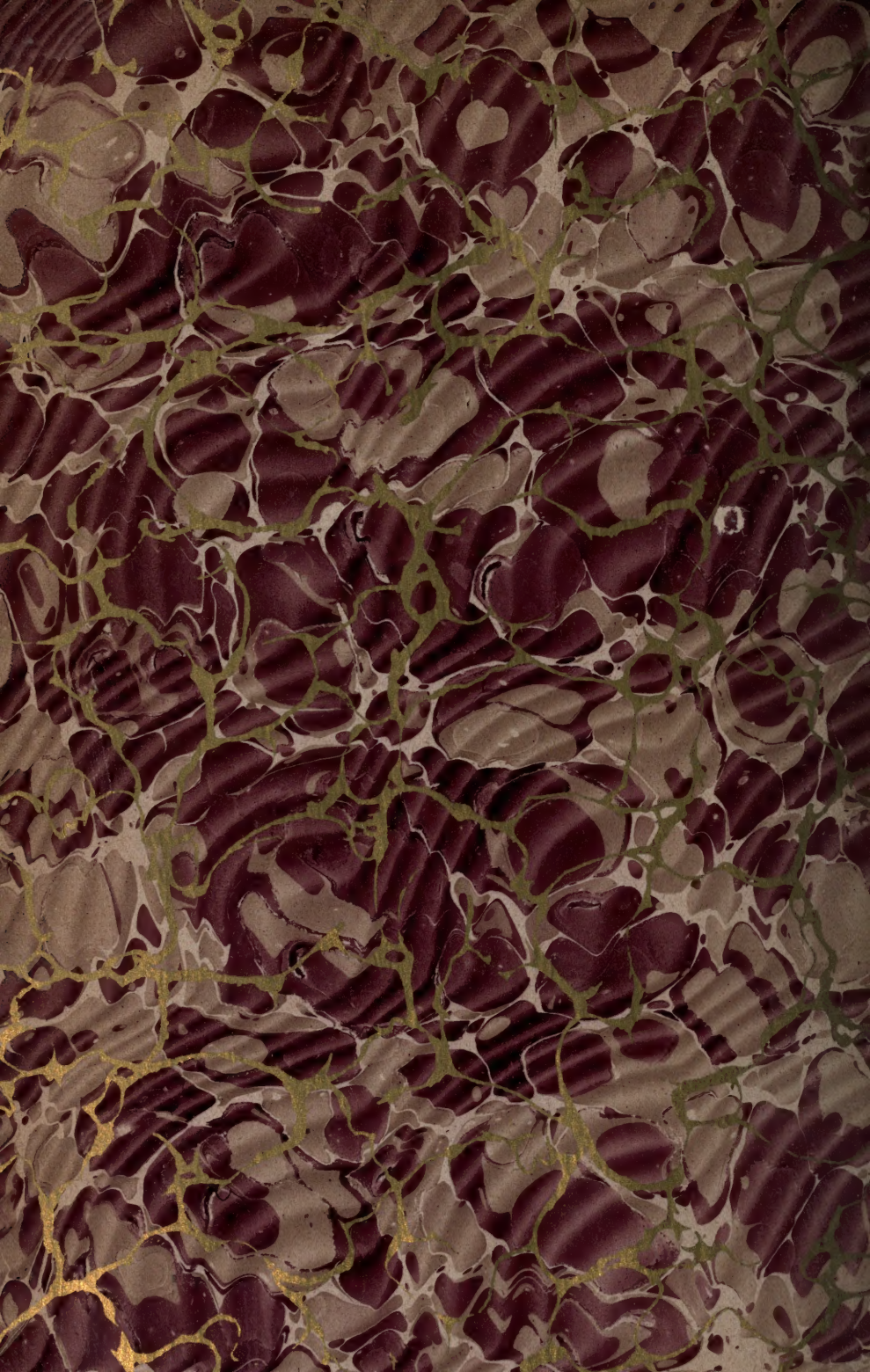














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